hp·ux/usr

Hands-On Solutions for HP-UX Users • July 1996

HP-UX 10.x and Serial Data Communications: The Important Changes

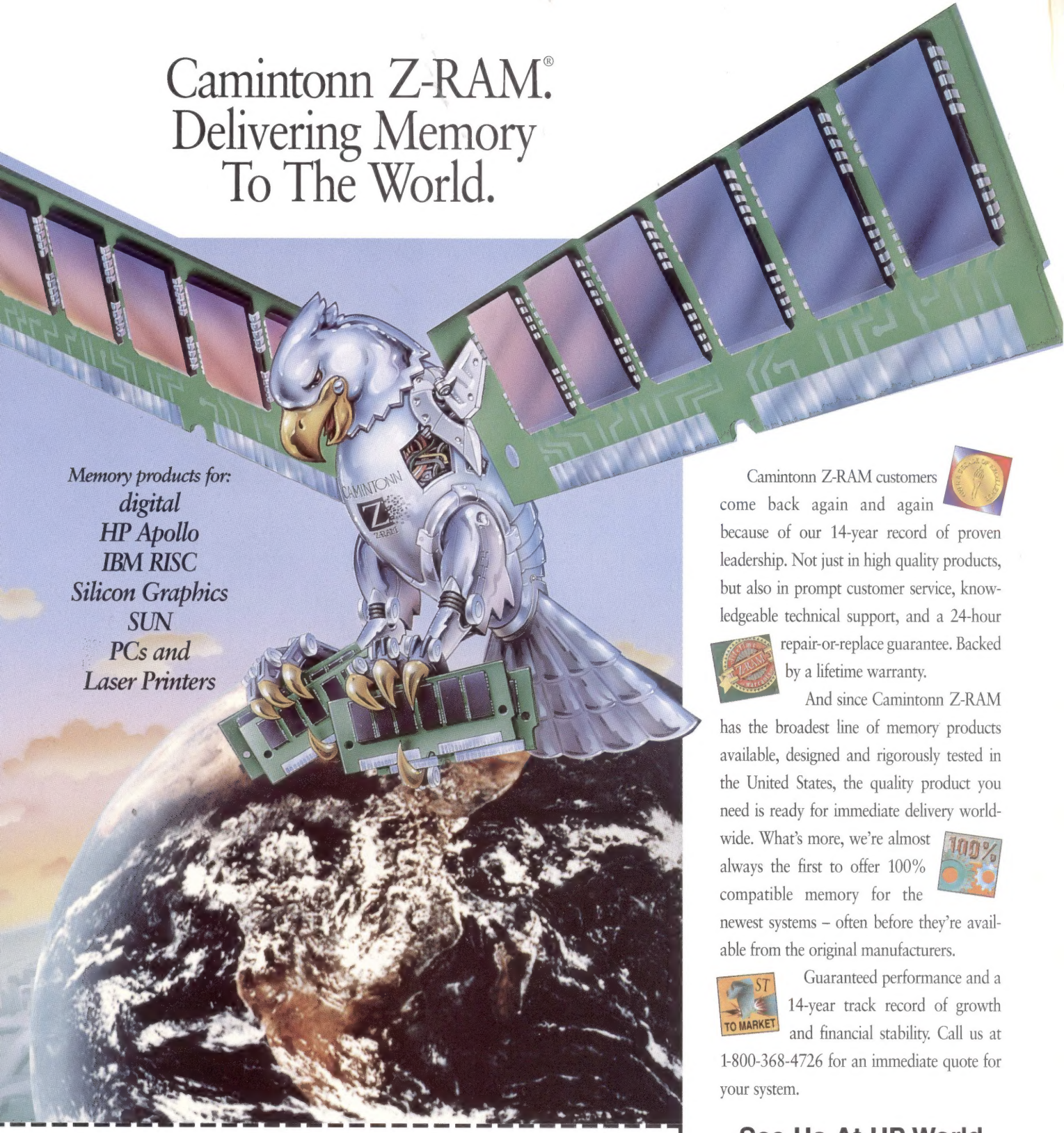
Software Review: Finesse: A Tool for Building Graphical Applications

Book Review: Portable Shell Programming

Legacy Application Access

A Publication of Interex • The International Association of Hewlett-Packard Computing Professionals

Camintonn Z-RAM.® Delivering Memory To The World.



Memory products for:
digital
HP Apollo
IBM RISC
Silicon Graphics
SUN
PCs and
Laser Printers

Camintonn Z-RAM customers come back again and again because of our 14-year record of proven leadership. Not just in high quality products, but also in prompt customer service, knowledgeable technical support, and a 24-hour repair-or-replace guarantee. Backed by a lifetime warranty.

And since Camintonn Z-RAM has the broadest line of memory products available, designed and rigorously tested in the United States, the quality product you need is ready for immediate delivery worldwide. What's more, we're almost always the first to offer 100% compatible memory for the newest systems – often before they're available from the original manufacturers.

Guaranteed performance and a 14-year track record of growth and financial stability. Call us at 1-800-368-4726 for an immediate quote for your system.

See Us At HP World
August 6–8, Anaheim
Booth #605

FREE
Camintonn Z-RAM Atlas
Your Guide To The World Of Memory

Fax this form back to us and we'll send you a Windows version of The Automated Upgrade Guide – (3.5" disk) a $49.95 value!

Name _____
Title _____
Company _____
Street _____
City/State/Zip _____
Phone _____ Fax _____

Which computer platforms are currently in use at your company? (check all that apply)

DEC _____ SGI _____
HP _____ SUN _____
IBM _____ PC LANs _____

CAMINTONN® CORPORATION
The last word in memory®

Tel: 800/368-4726 or 714/454-1500
Fax: 714/830-4726
U.K. Tel: 44/ 1 865-784747 • Fax: 44/ 1 865-784750

Camintonn/Z-RAM world headquarters located at 22 Morgan, Irvine, CA 92718-2202. European headquarters located at Oxford Science Park, OX4 4GA, U.K.

CIRCLE 30 ON READER SERVICE CARD

Is It New Or Is It Refurbished

The only difference is the money you save.

With 17 years of knowledgeable experience and reliable service, Monterey Bay Communications is a leader in Hewlett-Packard workstation remarketing. We're professionals at providing HP 1000 and 9000 users with reliable equipment that is functionally and cosmetically identical to what HP offers — and at substantial cost savings. In addition to the 700 / 400 / 300 / 200 series, Monterey Bay Communications also offers mass storage systems, monitors, memory and interfaces, as well as a variety of printers.

All equipment is warranteed and eligible for Hewlett-Packard maintenance. An extensive parts and spares inventory and knowledgeable staff ensure prompt service and immediate delivery.

For more detailed information or a price quotation, give MBC a call at 408/429-6144.

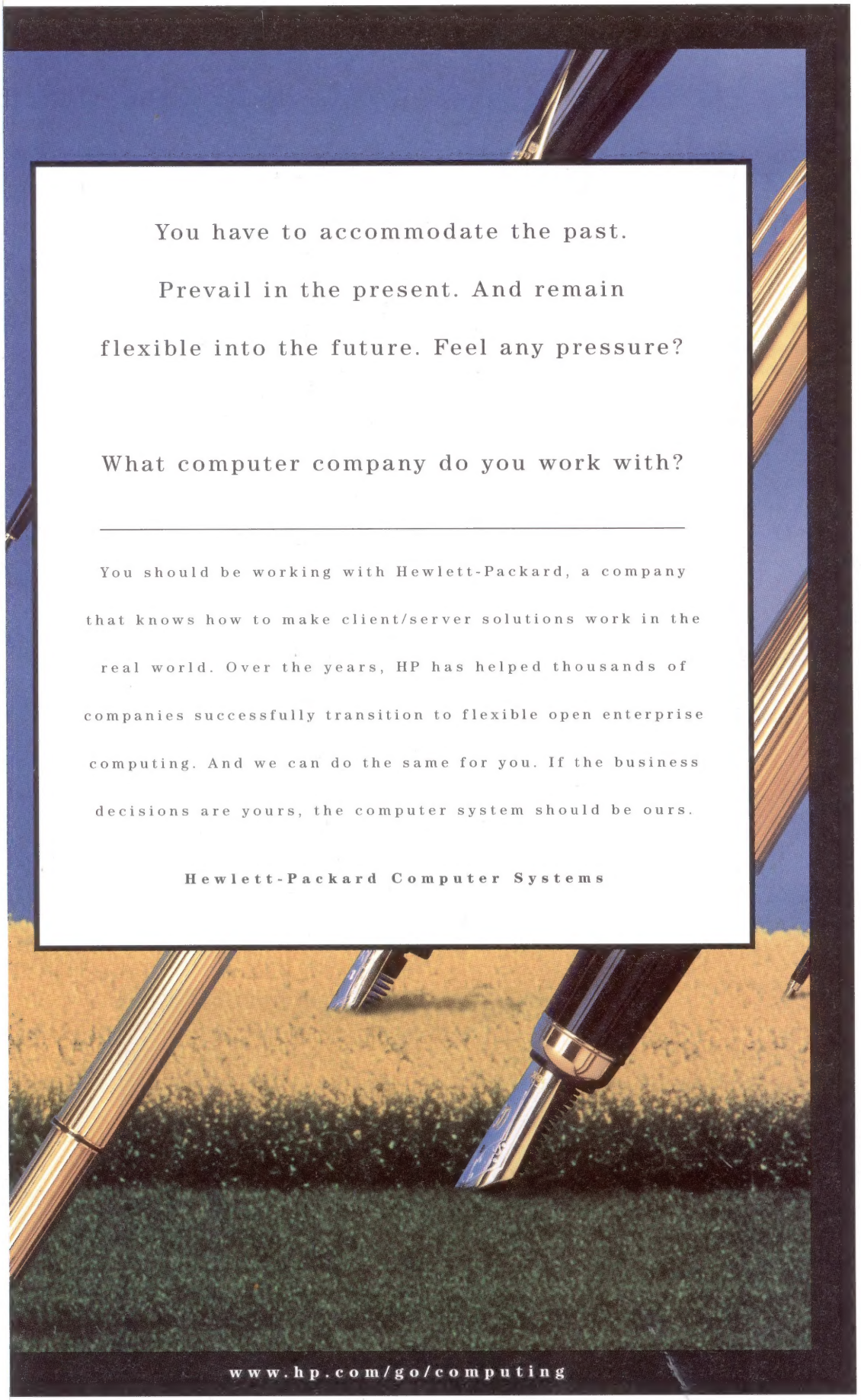
	NEW	MBC
Performance	✓	✓
Warranty	✓	✓
Support / Tech Expertise	✓	✓
Accessories	✓	✓
Maintenance Eligibility	✓	✓
Substantial Cost Savings		✓
Simple Order Processing		✓
Immediate Delivery		✓

CIRCLE 7 ON READER SERVICE CARD

MONTEREY BAY COMMUNICATIONS

The HP Workstation Remarketing Specialists

Monterey Bay Communications Inc., 1010 Fair Avenue, Santa Cruz, CA 95060 Tel: 408-429-6144 Fax: 408-429-1918



HEWLETT® PACKARD

hp·ux/usr

Volume 4, Number 4 July 1996

Contents

Features

HP-UX 10.x and Serial Data Communications: The Important Changes *by John A. Pezzano* 30

Software Review: Finesse: A Tool for Building Graphical Applications *by Kelley Fugelso* 36

Legacy Application Access *by Brian Hodgson* 44

Book Review: Portable Shell Programming *by Michael Ehrhardt* 50

page 44

Departments

Q & A 8

HP 1000 Guru 62

CSL Perspective 72

Industry Watch 74

New Products 76

Columns

HP-UX Systems Administration *by Chris Curtin* 18

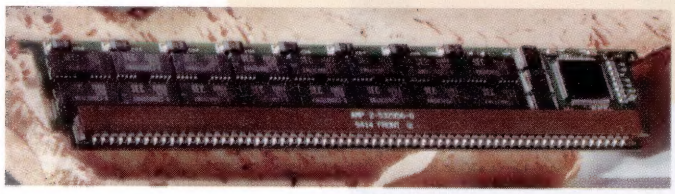
HP-UX *by David L. Totsch* 24

X-Watch *by Larry Headlund* 54

Internet Goodies *by Joseph Berry* 58

HP-RT *by Geff Blaha* 66

New Products
See page 76



Cover Story:
See page 30

Lose your mouse and increase your productivity.

From Wall Street to Silicon Valley, your top competitors have replaced hundreds of free mice that came with their workstations with $199 MOUSE-TRAK™ trackballs. The reason: productivity and reliability.

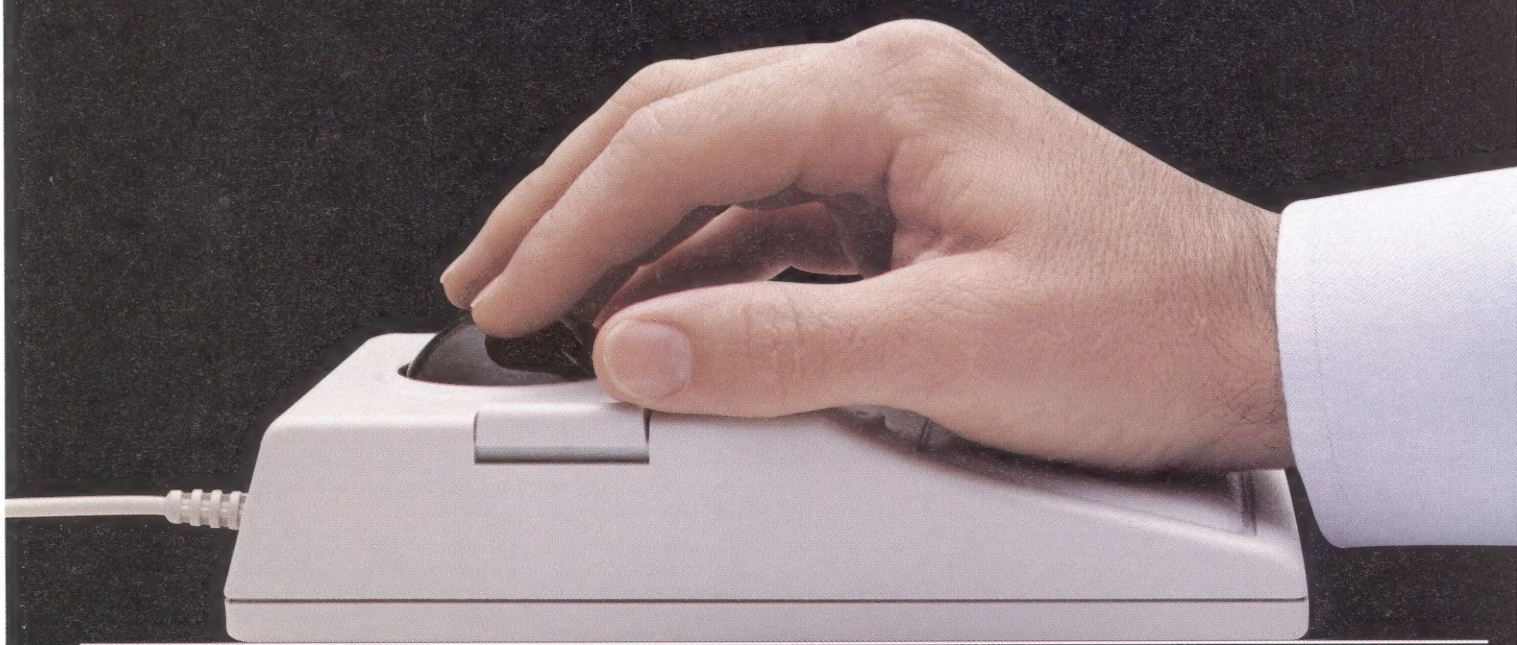
Productivity: Laboratory testing has shown that only 4 hours of continuous mouse usage can result in as much as 60% loss of hand strength. A trader, engineer, or data entry user in that condition is simply not going to be as productive in the second half of the day as in the first. The same tests show no signs of physical fatigue when using a MOUSE-TRAK.

Reliability: MOUSE-TRAK's rugged construction results in *much* higher reliability than mice or consumer trackballs. MOUSE-TRAK doesn't take traders out of play or make support people pull their hair out!

Call, Fax, or email today to order or receive more information about MOUSE-TRAK.

1-800-533-4822
sales @ moustrak.com
http://www.mousetrak.com

mouse-trak®
The Professional's Trackball



ITAC Systems, Inc. 214 494 3073 Fax 214 494-4159

International MOUSE-TRAK dealers: UK NTWare Ltd. Tel: 0865 784990 **SunExpress** Tel: 0800 89 88 88 • **France PHASELYS** Tel: 1 43 94 42 42 **RISC TECHNOLOGY EUROPE** Tel: 01 41 85 10 20 **SunExpress** Tel: 05 90 61 57 • **Germany The Chameleon Group** Tel: 0211-379057 **SunExpress** Tel: 01 30 81 61 91 • **Switzerland Datacomp** Tel: 01 740 51 40 **SunExpress** Tel: 155 19 26 • **Denmark DeSeCAM** Tel: 48 24 12 04 • **Holland SunExpress** Tel: 06 022 34 45 • **Canada Guillevin** Tel: 416 670 8433 • **Australia Hypec Electronics** Tel: (02) 808 3666 • **Sweden SPECMA** Tel: 031 89 16 00 **SunExpress** Tel: 020 795 726 • **Korea Aurora Systems, Inc.** Tel: 718-4985 • **Israel Seg Tec** Tel: 972 3 556 7458 • **Japan SunExpress** Tel: 0120-33-9096 MOUSE-TRAK is manufactured in the U.S.A. by ITAC Systems, Inc., 3113 Benton Street, Garland, Texas 75042 Fax: 214/494-4159 Patented by ITAC Systems, Inc. MOUSE-TRAK is a registered trademark of ITAC Systems, Inc. Other brand and product names are trademarks of their respective holders.

CIRCLE 117 ON READER SERVICE CARD

hp-ux/usr
A Publication of Interex®

http://www.interex.org/

INTEREX EXECUTIVE DIRECTOR
Charles A. Piercey

PUBLICATIONS MANAGER
Connie Wright

EDITORIAL

MANAGING EDITOR
Michael Ehrhardt

COPY EDITOR
Richard Kranz

NEW PRODUCTS EDITOR
Michelle Pollace

PROOFREADER
Jean Nattkemper

ADVERTISING & MARKETING

ADVERTISING SALES MANAGER
Brian Hallin

ADVERTISING REPRESENTATIVE
Kathie Schwartz

ADVERTISING COORDINATOR
Phil Nguyen

DESIGN AND PRODUCTION

SENIOR GRAPHICS DESIGNER
Molly McGinnity

DESKTOP PUBLISHING SPECIALIST
June Ramirez

GRAPHICS PRODUCTION SPECIALIST
Gale Patterson

hp-ux/usr is published bimonthly by Interex, the International Association of Hewlett-Packard Computing Professionals. Second-class application pending at Sunnyvale, California 94086 and additional offices. The editorial and business offices are located at 1192 Borregas Ave., Sunnyvale, California 94089, USA, 408.747.0227, Fax 408.747.0947. Address membership questions and change of address to Membership Services. Address all questions concerning circulation/distribution to the Distribution Manager.

Remittances should be sent to Interex, File No. 61054, P. O. Box 60000, San Francisco, California 94160, USA.

Address all editorial correspondence to Michael Ehrhardt, Editor, *hp-ux/usr* Magazine, c/o Interex, P.O. Box 3439, Sunnyvale, California 94088-3439, USA.

Subscription to *hp-ux/usr* is $49.50 (6 issues) per year in the U.S., add $25.00 for Canada and Mexico, add $50.00 for all other countries. Member Services (Associate, Contributing or Online Service Package membership levels) include a subscription to *hp-ux/usr.* at $49.50. For other Member Services refer to membership form.

POSTMASTER: Send address changes to: Interex, P.O. Box 3439, Sunnyvale, California 94088-3439 USA. Attention: Member Services.

How to Contact Interex...

EDITORIAL SUBMISSIONS

hp-ux/usr encourages readers to contribute their opinions, tips, and solutions. When sending letters for publication or to request author contribution guidelines, please address them to *hp-ux/usr* editor Michael Ehrhardt.

Postal Address:
Interex
P.O. Box 3439
Sunnyvale, CA 94088-3439

Office Address:
1192 Borregas Avenue
Sunnyvale, CA 94089

Because of the difference in zip codes between our office address and P.O. Box, please be sure to address all regular mail to the P.O. Box. Any express service packages should be delivered to the Borregas Avenue address. Thank you for your attention to this small but significant detail.

TELEPHONE:

The Interex switchboard is open 8:00 a.m.–5:00 p.m., Pacific Time. Call 800.468.3739 (U.S. and Canada) or 408.747.0227. After 5:30 p.m. our voicemail system will record your call.

FACSIMILE:

Call 408.747.0947

INTERNET:

To send e-mail to Interex, use the following address format:
<IDname>@interex.org
The following IDs are currently active on Interex's HP 9000:

Address	Department
ehrhardt	*hp-ux/usr* Letters to the Editor, Q&A, and requests for author guidelines
webmaster	Internet support
cslhpux	Contributed Software Library
membership	Membership/subscription inquiries and services
pubs	Circulation and advertising inquiries
conference	Conference questions and arrangements

An example would be pubs@interex.org
Anything before the @ sign is case insensitive.

COMPUSERVE:

Interex can be contacted via the CompuServe ↔ Internet gateway. To send CompuServe mail, use the following format:

>INTERNET: pubs@interex.org

You can address your mail to specific departments using the ID's listed above.
Interex maintains a CompuServe account that is collected daily. Please address all messages to ID no. 76376, 1222.

interex

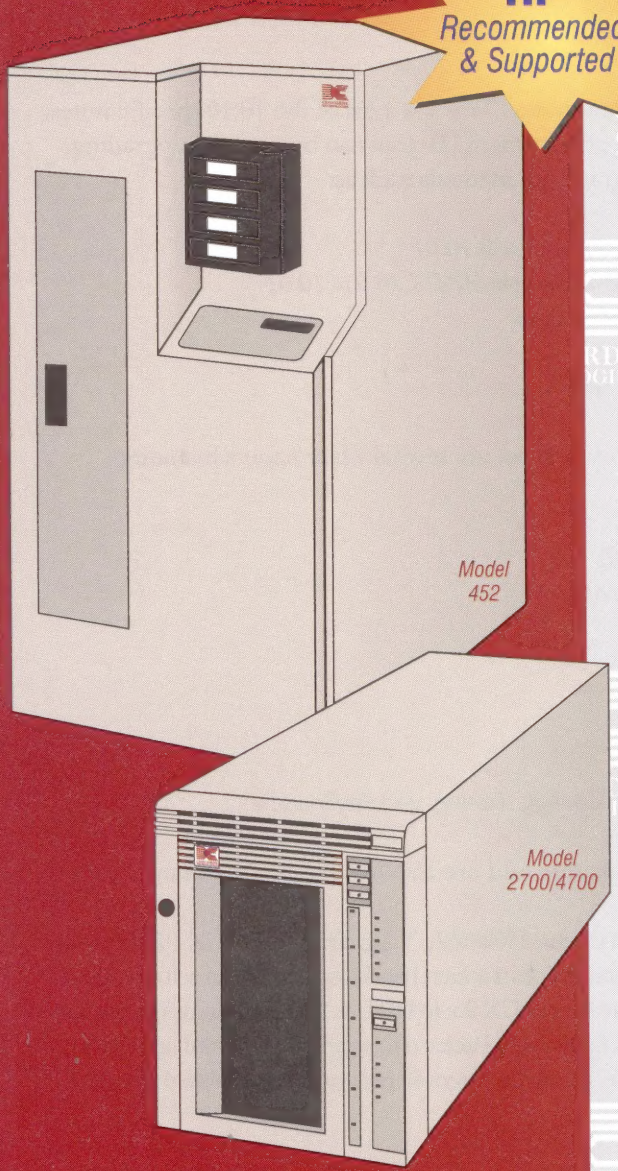
Shared Knowledge.
Shared Power.

As a not-for-profit association of HP computing professionals, Interex is dedicated to meeting the information, education, and advocacy needs of its members worldwide.

In today's world of rapidly changing technology, Interex puts hands-on solutions to hardware, software, and operating system problems at your fingertips. Because members actively contribute—exchanging ideas and sharing solutions—Interex is a vital link in the transfer of HP expertise.

Operating independently from Hewlett-Packard, Interex has more than 20 years of serving HP computing professionals. Through its publications, conferences, and volunteer committee structures, Interex has the qualifications to represent you, a valuable member of the HP user community.

DLT Tape Solutions for Your HP 9000



Capacity, Performance & Reliability

These are all advantages inherent to Digital Linear Tape (DLT) technology. Your data-intensive applications require an "industrial strength" solution. DLT Tape offers exceptional durability and data integrity along with the ability to grow easily with your emerging needs.

Concorde Technologies, Inc. provides a full line of DLT tape solutions.

DLT Drives

- 20-40 GB Capacity/Tape*
- SCSI-2 Interface
- 2 Year Warranty
- 1040 GB Library Capacity*
- 1.5-3.0 MB/Sec. Drive Transfer Rate*
- 80,000 Drive MTBF
- 10,000 Hour Head Life

DLT Libraries

- 1-9 Drives/Library
- 3-of-9 Bar Code Reader
- Up to 264 DLT Cartridges
- Capacities to 10 TB/Library*
- Operator Load Port
- Hewlett-Packard Support
- Throughput to 1.3 TB/Hour*
- Cost-Effective Upgrades

DLT Software

- Backup/Restore Software
- "Hot" Database Backup
- Bar Code Support
- Client/Server Support
- HSM Software
- OmniBack II Support
- Lights Out Automated Operation
- Heterogeneous Network Support

Concorde specializes in high-performance network backup/restore solutions for HP 9000 Servers and Workstations. Backed by HP experience and a commitment to support, Concorde is an established leader among Hewlett-Packard Channel Partners.

To discuss your specific application or for a free backup/restore solutions catalog, contact a Concorde Sales Engineer.

800-359-0282

CONCORDE TECHNOLOGIES

HEWLETT PACKARD Channel Partner

Concorde Technologies, Inc.
9770 Carroll Center Road, Suite F, San Diego, CA 92126-6504 USA
(619) 536-5500, (800) 359-0282, Fax: (619) 566-4396
E-mail: info@concordetech.com
http://www.concordetech.com

* Assumes 2:1 compression

CIRCLE 113 ON READER SERVICE CARD

Question & Answer

Q: What documents are available for upgrading to 10.xx?

A: Many of the engineering notes and white papers can be located on the HP Support Server. They are also available through the HP Response Centers worldwide. These documents, coupled with the upgrade manuals and Release Notes, will provide ample documentation for 10.xx upgrades.

The starting point is *http://support.mayfield.hp.com* in the Problem Solving Databases. You will find the index documents by using a search pattern such as

where can i find q&as

The Q&As have document IDs such as UNX1010### for the 10.10 release and UNX1001### for 10.01. A good starting point is with documents

UNX1010262	10.x General
UNX1010261	10.10 General

Table 1 is a list of the 10.x general notes. *Table 2* is a list of the 10.10-specific notes. Each document is a collection of document IDs that can be used for upgrading.

Shipped with the 10.xx upgrade are manuals such as:

Upgrading from HP-UX 9.x to 10.01 version B.10.01
Installing HP-UX 10.01 and Upgrading from HP-UX 10.0 to 10.01
HP-UX 10.01 System Administration Tasks
Release Notes for HP-UX 10.01
Managing HP-UX Software with SD-UX

In the */usr/share/doc* directory at 10.xx are several white papers including:

File System Layout
10.01 Documentation Map(ASCII)
10.01 Documentation Map(Postscript)
10.0 Memory Management
10.0 Process Management
10.01 Patch Program
10.01 Patch List
NFS Diskless Concepts & Admin
NFS Client/Server Configuration, Topology, Tuning, and Performance

The Release Notes are invaluable and are also located in */usr/share/doc* for a 10.xx installation.

Another resource is the customer class H6288SA, "Upgrading to HP-UX 10.01 Hands-On Workshop," a two-day course that guides students hands-on through an actual upgrade of an HP 9000 computer system from HP-UX 9.x to HP-UX 10.01. Students use the special tools and processes provided by Hewlett-Packard to support successful upgrades.

For those who need assistance, a custom upgrade program is available through the

There Is A Better Way To Access Your Data

VISIMAGE — The Right Tool for Report Writing Won't Hammer Your System

Visimage, the original client-server report writer in the HP market, keeps getting better. Visimage now provides a Microsoft® Windows™ interface. Familiar mouse-driven icons empower users to select, report and download data in a controlled environment. Visimage is easy to set up and easy to use. Advanced reporting capabilities assure that users never outgrow the power of Visimage.

Our unique client-server technology minimizes resource demand through serial or network connections. Data remains on the host server, maintaining security and accuracy while eliminating potential network overloads. Users can schedule Visimage reports on the host that run independently of their PCs. Efficient data retrieval can be further enhanced by integration with HP third party indexing tools.

Choose Visimage, the right tool to access IMAGE, IMAGE/SQL, ALLBASE, ORACLE®, KSAM, C-ISAM® and flat files on your HP 3000 or HP 9000 computer.

Call now for your FREE Windows™ or MS-DOS® demo diskette!

HEWLETT PACKARD
Channel Partner

VITAL Soft INCORPORATED

1-800-VITALSOFT
1-800-848-2576
1153 Bordeaux Drive, Suite 101
Sunnyvale, CA 94089-1210 Fax: (408) 745-6681
75362.762@compuserve.com

CIRCLE 183 ON READER SERVICE CARD

Response Center. This program provides several levels of assistance depending on the system and the need for detailed help converting to logical volumes. The product is H6314A.

Q: How do I set a dialup password for an internal modem on a 10.x system?

A: 1. Edit */etc/dialups* to add a list of dialin ports for which you want to have a dialup password. For example, it might contain the following:

```
/dev/ttyd0p7
/dev/ttyd0p1
```

2. Edit */etc/d_passwd* to look like:

```
/usr/bin/sh::comment
```

where the first field is the shell to be used, the second field is reserved for an encrypted password, and the third field is comment.
3. Add the password to */etc/d_passwd* using the following command:

```
passwd -F /etc/d_passwd /usr/bin/sh
```

This will prompt for the password, adding a single dialup password for any port listed in the */etc/dialups file.*

Note: On trusted HP-UX 10.01 dialup password is NOT used. The source code for login shows it completely skips the dialup password check if the system is trusted. A fix will be available in the future.

Q: At 10.xx, I'm getting the message "bad shell at login." What's wrong?

A: Make sure there is a shell program located at the path specified by the entry in the password file. A common error is to specify */usr/bin/sh* rather than */sbin/sh,* which is the correct location for the statically linked version of the Posix shell.

Q: I have one of the new EISA Mux cards in a D-series computer. It appears that the panel wiring is different from previous Mux panels from HP.

A: That's true. The EISA Mux panel wiring is shown on the back of each panel. In the past, HP used the convention that a straight-through cable be used to connect a terminal to the panel. This implied that the panel was a DCE device, somewhat in conflict with industry conventions.

With the EISA Mux, the panels are now DTE so that a straight-through cable correctly connects to a modem and a null modem cable is used for terminals and printers.

HP makes adapter cables that convert the RJ-45 signals to match the older HP version of RJ-45 Mux panels. These are:

J2488-60010	Equinox rj45 to hprj45	to order 1 ea
J2488-60001	Equinox rj45 to hprj45	to order bundle of 16
J2489-60010	Equinox rj45 to db25	to order 1 ea

Both 25-pin as well as RJ-45 Mux panels are available. Cables for RJ-45 can be purchased from Equinox at (954) 746-9000. Their Web page is *http://www.equinox.com.*

Q: I am getting the message

RPC_PROG_NOT_REGISTERED

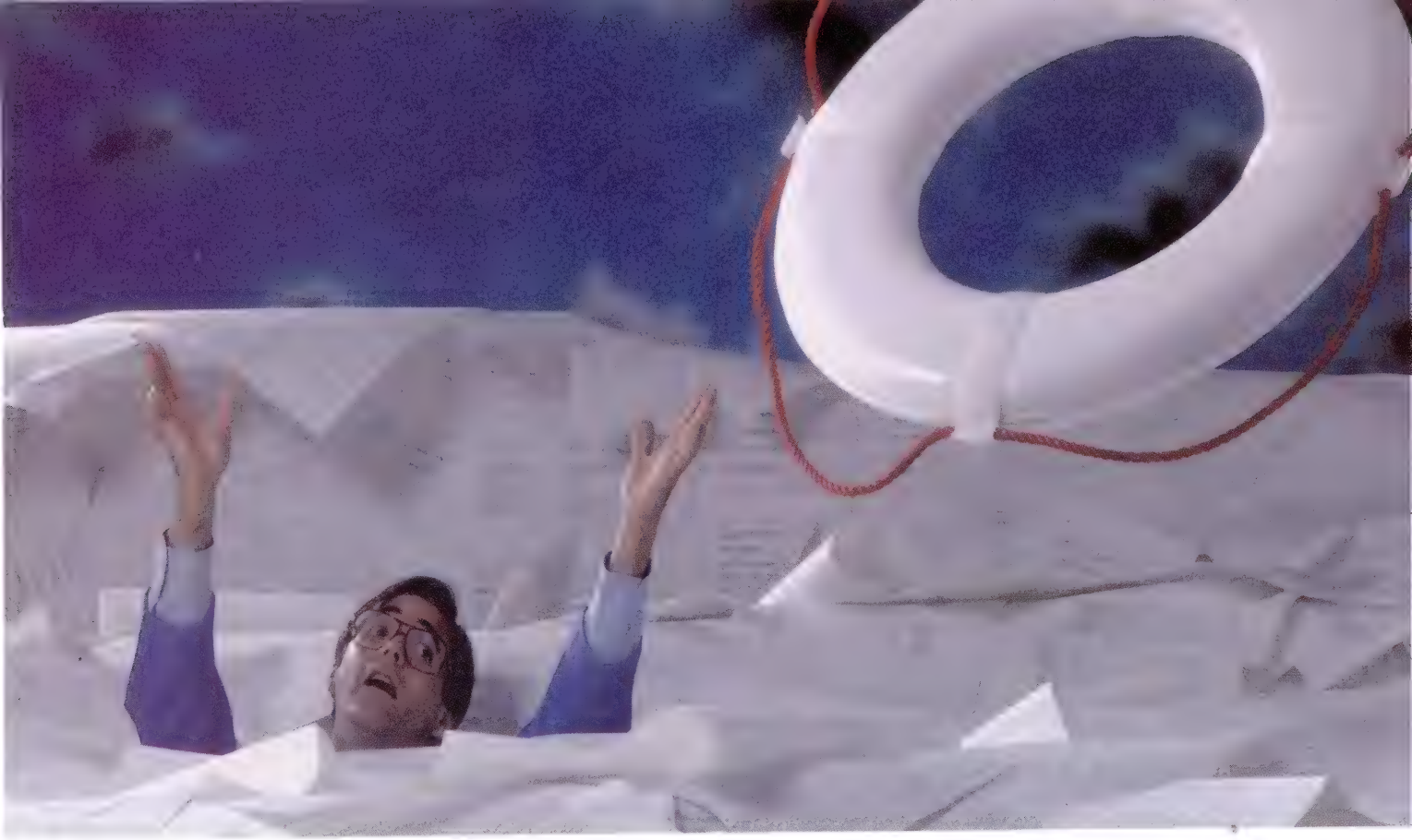
with PFS (Portable File System) for CD-ROMs. Why?

A: PFS is the Portable File System product from Young Minds, Inc., which began shipping at the end of 1995 with the application media. It enables the use of CD-ROMs that have RockRidge Extensions and controls the behavior of UPPERCASE and lowercase filenames.

Running PFS on HP-UX requires network loopback be configured in addition to networking in general. `netstat -rn` shows the network routing tables and the lo0 entry for the loopback interface. Error messages vary slightly depending on whether a gateway is configured or not. Make sure */etc/netlinkrc* contains

```
/etc/ifconfig lo0 inet 127.0.0.1 up
```

as found in */etc/newconfig/netlinkrc* (for 9.xx systems). This file



End Inundata!

Save your organization from drowning in a sea of paper with NERDD. The NERDD (Networked Electronic Report and Document Distribution) suite of scalable software modules provides the latest document management technology to control all text and image documents in one cohesive solution.

It combines advanced file management and storage techniques so you can index documents automatically and store them on disk, optical storage devices or other appropriate media for rapid on-demand retrieval and printing. Because documents can be viewed in HP's standard PCL printer language—as well as text and images—you get more choices while reducing complexity and improving interoperability. You can even annotate documents with highlighters and Post-It-like notes.

NERDD also supports scanning of externally created documents through NERDD/Scan and NERDD/Scan+ options—giving you a complete Electronic Document Management solution.

CIRCLE 135 ON READER SERVICE CARD

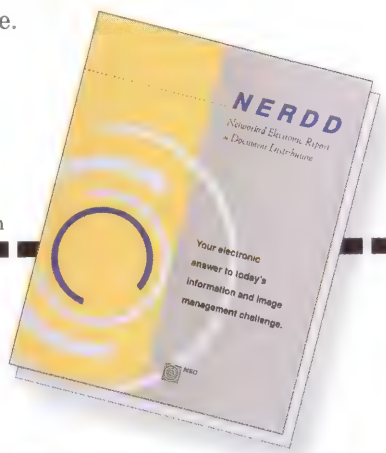
So if you want to eliminate lost or misfiled papers, end waiting time, and cut the high cost of storage and retrieval, consider NERDD. For a FREE Cost Justification Analyzer and NERDD brochure, fill out the coupon and send it to the address below or fax it to (510) 225-1420. Or call toll-free.

1-800-538-3818

NSD

6602 Owens Drive, Suite 100
Pleasanton, CA 94588

E-mail address is info@nsd.com
See us on the World Wide Web: http://www.nsd.com



☑ **Yes! I want to end inundata!**

- ☐ Send me your *FREE* Cost Justification Analyzer and brochure
- ☐ I'm in a hurry. Have a sales rep call me

Name: _____

Title: _____

Company: _____

Address: _____

City/State/Zip: _____

Phone Number: _____

TABLE 1 *A list of the 10.x general notes*

UNX1010005	Which patches are rolled into 10.x? How can I tell?
UNX1010074	How do I upgrade DTC/RX software from HP-UX 9.x to 10.x?
UNX1010065	Are hard disk partitions supported at 10.10? If so, how to create?
UNX1010086	Is Perl supported as a language in HP-UX 10.x?
UNX1010093	Will system performance check utility (e.g.,9.x monitor) be available?
UNX1010098	Can I toggle between multiuser mode and ISL mode without rebooting?
UNX1010138	Why are executable shell built-ins (alias, echo...) in /usr/bin?
UNX1010139	Why has the default umask value been set to 00 in 10.x?
UNX1010140	How do I install a patch on HP-UX 10.x?
UNX1010144	Will buffer cache shrink if using Dynamic Buffer Cache, under pressure?
UNX1010145	Which Rocky Mountain Basic/UX (RMB/UX) is supported on HP-UX 10.x?
UNX1010148	Does curses support Japanese?
UNX1010210	Is getcontext(2) on 10.x used the same as on 9.x?

TABLE 2 *A list of the 10.10 specific notes*

UNX1010241	Graphics/X
UNX1010242	Upgrade/9.U3
UNX1010243	CDE/VUE
UNX1010244	LFS (Large File System)
UNX1010245	LVM (Logical Volume Manager)
UNX1010246	Large Physical Memory/RAM
UNX1010247	DHCP (Dynamic Host Configuration Protocol)
UNX1010248	NFS Diskless/NFSD
UNX1010249	Networking
UNX1010250	PFS/Rock Ridge
UNX1010251	Q4 Debugger/q4
UNX1010252	SAM (System Administration Manager)
UNX1010253	Large Process Data Space/EXEC_MAGIC
UNX1010254	SMP/Multi-Processor
UNX1010255	General Debugging
UNX1010256	General File System
UNX1010257	Systems
UNX1010258	Peripherals
UNX1010259	SD-UX (Software Distributor for HP-UX)
UNX1010260	HP-RT, RTAP

is a "virgin" file, before user customizations are made. An extract of the file shows:

```
    case $NODENAME in
     *) /etc/ifconfig lan0 inet `hostname` up
        STATUS=$?
        if [ ! $STATUS -eq 0 ]
        then
         net_init=1
        fi
        /etc/lanconfig lan0 ether
        STATUS=$?
        if [ ! $STATUS -eq 0 ]
        then
         net_init=1
        fi
        ;;
    esac
==> /etc/ifconfig lo0 inet 127.0.0.1 up <===== this is the line
    STATUS=$?
    if [ ! $STATUS -eq 0 ]
    then
     net_init=1
    fi
```

The line marked with ===> shows the loopback entry. For 10.xx version systems, the file is: */etc/rc.config.d/netconf* and the entry should read

```
LOOPBACK_ADDRESS=127.0.0.1
```

Here are the symptoms. In this case, a script called *start_pfs* is used to start the PFS daemons in the order described in PFS docs:

1. If no loopback and no gateway specified either:

```
# netstat -rn

Routing tables
Destination     Gateway          Flags    Refs     Use  Interface
15.14.120       15.14.120.103    U          2      337  lan0

#     ./start_pfs
```

```
Start pfs_mountd ... wait 10 seconds to make sure it started OK...
unable to register (MOUNT_PROGRAM, MOUNT_VERSION, udp).
   UID   PID  PPID  C    STIME TTY      TIME COMMAND
  root   683   673  0 17:24:38 ttyp6    0:00 /usr/contrib/bin/pfs_mountd
Start pfsd    ... wait 10 seconds to make sure it really started ...
unable to register (PFS_PROGRAM, PFS_VERSION, udp).
/usr/contrib/bin/pfsd: can't contact pfsd.rpc:
   mycpu: RPC_PROG_NOT_REGISTERED
```

(PFS does not get started)
By adding the loopback:

```
# netstat -rn
Routing tables
Destination    Gateway      Flags     Refs    Use  Interface
127.0.0.1      127.0.0.1      UH      0       0    lo0
15.14.120      15.14.120.103  U       6       459  lan0
#    ./start_pfs
Start pfs_mountd ... wait 10 seconds to make sure it started OK...
   UID   PID  PPID  C    STIME TTY      TIME COMMAND
  root   607   597  0 17:54:27 ttyp7    0:00 /usr/contrib/bin/pfs_mountd
Start pfsd ... wait 10 seconds to make sure it started OK...
   UID   PID  PPID  C    STIME TTY      TIME COMMAND
  root   615   597  0 17:54:37 ttyp7    0:00 /usr/contrib/bin/pfsd
Startup of pfs completed.
#
```

2 If no loopback but gateway is configured:

```
# netstat -rn
Routing tables
Destination    Gateway      Flags   Refs  Use  Interface
default        15.14.120.1    UG    2     100  lan0
15.14.120      15.14.120.103  U     7     383  lan0

#    ./start_pfs
Start pfs_mountd ... wait 10 seconds to make sure it started OK...
/usr/contrib/bin/pfs_mountd: can't contact pfs_mountd.rpc:
   mycpu: RPC_PROG_NOT_REGISTERED
```

(PFS does not get started)
Now add the loopback:

```
# netstat -rn
Routing tables
Destination      Gateway         Flags     Refs     Use     Interface
127.0.0.1        127.0.0.1       UH          0       0       lo0
default          15.14.120.1     UG          2     123       lan0
15.14.120        15.14.120.103   U           6     411       lan0
#    ./start_pfs
Start pfs_mountd ... wait 10 seconds to make sure it started OK...
   UID   PID  PPID  C    STIME TTY      TIME COMMAND
   root  593   583  0 18:01:05 ttyp7    0:00 /usr/contrib/bin/pfs_mountd
Start pfsd ... wait 10 seconds to make sure it started OK...
   UID   PID  PPID  C    STIME TTY      TIME COMMAND
   root  601   583  0 18:01:15 ttyp7    0:00 /usr/contrib/bin/pfsd
Startup of pfs completed.
#
```

Q: I have a 725 running HP-UX 9.05. My root disk has quite a bit of I/O contention. The system has also started to page a bit. This has also increased the contention on the root disk. What can I do until I get more physical memory?

A: The priority of primary swap is 0. That cannot be changed. As a result, when the system starts to page, primary swap will be one of the first swap areas used. If necessary, you can move your primary swap to another disk.

For example, let's say there is another disk at address 5. Currently, that disk has a file system on it and secondary swap at the end of the disk. We will make the swap area at address 5 primary swap and change the swap on the root disk to a secondary swap area.

1. Create an entry in the kernel configuration file */etc/conf/dfile* for swap. The line will use the following syntax :

```
swap driver address swap_location
```

swap is the special keyword for the primary swap designation line.
driver is the device driver used to communicate to the disk.
address is the minor number for the device in hexadecimal.
swap_location will be 0 or -1. 0 specifies that the entire disk is used for swap. -1 specifies that the swap follows a file system.

So, the newly added line would be

```
swap scsi 201500 -1
```

2. Create a new kernel with the newly altered dfile:

```
# cd /etc/conf
# config dfile
# make config.mk
# cp /hp-ux /SYSBCKUP
# mv ./hp-ux /hp-ux
```

3. Remove the entry from */etc/checklist* for the secondary swap area, and add a new one for the swap area on the root disk. Remember, primary swap does not need to be in the checklist file.
   So, the line

```
/dev/dsk/c201d5s0    default       swap     end   0 0
```

will be removed. And the line

```
/dev/dsk/c201d6s0    default       swap     end,pri=3   0 0
```

will be added. Notice the change in priority.

4. Reboot the machine.

Q: I have a 712/60 running HP-UX 10.01. I am having problems with busy files during my automated backup. How can I perform my backup in single-user mode?

A: You will need to create a special script that will be run via cron. This script will shut down the system to single-user mode, execute the backup, and reboot the system.

1. Put the script in the root file system. This is because all of the file systems will be umounted during the shutdown.
2. End the script file's name in "rc." This will prevent the script from being killed during the shutdown.
3. Give the script file execute permissions.
4. Use the *-y* option with the shutdown command in the script.
5. Redirect standard out and error in the crontab entry.

An example script might look something like this :

```
/usr/sbin/wall /message.shut
/usr/sbin/shutdown -y 0
/usr/sbin/mount -a -F hfs
```

```
<backup command>
/usr/sbin/reboot
```

Remember to use full pathing in the scripts as you would with any cron script.

Put an entry in the crontab for root:

1. Put the current contents of the crontab into a file for editing.

```
# /usr/bin/crontab -l > /root_tab
```

2. Add an entry to the crontab file. This entry will run the script every night at 11 p.m.

```
0 21 * * * /backuprc > /backup.out 2>&1
```

3. Submit the new crontab.

```
# /usr/bin/crontab /root_tab
```

This scenario will also work at 9.x, but note that the paths for the commands will be different.

Q: I have a 720 running HP-UX 10.01. I pull patches down myself from the Web site. How can I put multiple patches in a single depot?

A: You can use the *swcopy* command to do so.

```
# ls /tmp/patches
PHNE_7075          PHNE_7075.text     PHKL_7017.depot
PHNE_7075.depot    PHKL_7017          PHKL_7017.text
```

1. Make the directory for your depot.

```
# mkdir /var/patch.depot
```

2. Use the *swcopy* command to create the depot. Essentially, you are merging depots. Each patch is its own depot. This depot contains one product, the patch. The syntax used is

```
swcopy -s source software_selections @ target_selection
```

The *source* is the patch depot. The *software_selections* is the product in the depot that is being copied. The *target_selection* is the destination depot.

```
# swcopy -s /tmp/patches/PHNE_7075.depot PHNE_7075 @ /var/patch.depot
# swcopy -s /tmp/patches/PHKL_7017.depot PHKL_7017 @ /var/patch.depot
```

The default behavior of *swcopy* is automatically to register the depot. The depot can be manually registered and unregistered with *swreg(1M)*.

```
# swlist -l depot
# Initializing...
# Target "mysystem" has the following depot(s):
  /var/patch.depot
# swlist -l product -s /var/patch.depot
# Initializing...
# Contacting target "mysystem"...
#
#    Target:  mysystem:/var/patch.depot
#
  PHNE_7075     B.10.00.00.AA  Cumulative Mux and Pty Patch
  PHKL_7017     B.10.00.00.AA  Patches for VxFS (JFS)
```

Q: I have a 712/80 running HP-UX 9.07. I am going to upgrade my system to 10.01. How do I convert my system to use Logical Volume Manager?

A: First, you must upgrade your system to 10.01. Any SDS arrays will be converted automatically to use LVM during the upgrade. After the upgrade, you can convert any other secondary disks to LVM by backing up the data, configuring the disk using LVM, and restoring the data. The root disk cannot be converted to use LVM during the upgrade. You must reinstall the root disk. Or, if you have a spare disk, you can create an LVM boot disk.

Q: How do I verify the contents of a backup created with *fbackup*? How can I tell which tape a file is on with a multiple-tape backup?

A: *fbackup* uses an index at the beginning of each tape. This index is a list of all the files that were qualified by the scope that was given with the *fbackup* command. The list of files is the same across every tape in the backup. However, each file is associated with a tape number.

On the first tape, every file is associated with tape number 1. On the second tape, every file that was not backed up on tape 1 is associated with the number 2. On the third tape, every file that was not backed up on 2 is associated with the number 3, and so on. It is clear that the last tape in the backup will have the most accurate association of file to tape number.

However, the index is a list of what *fbackup* "plans" to back up. This does not mean the file is actually on a tape. It is possible that the file was removed or that the file was busy. There is a better way to tell if the file is actually there. You can use the *-N* option with *frecover* to produce a listing of what is actually on a tape.

```
# frecover -r -vNf /dev/rmt/0m >
                                /backup.out
```

Q: I have a 715 running HP-UX 9.05. I run an application that requires a data segment size larger than 1 GB. What can I do?

A: Quadrant 2 of a process's virtual address space is used for the data segment. Since each quadrant is 1 GB in size, this limits a process's data segment to roughly 1 GB.

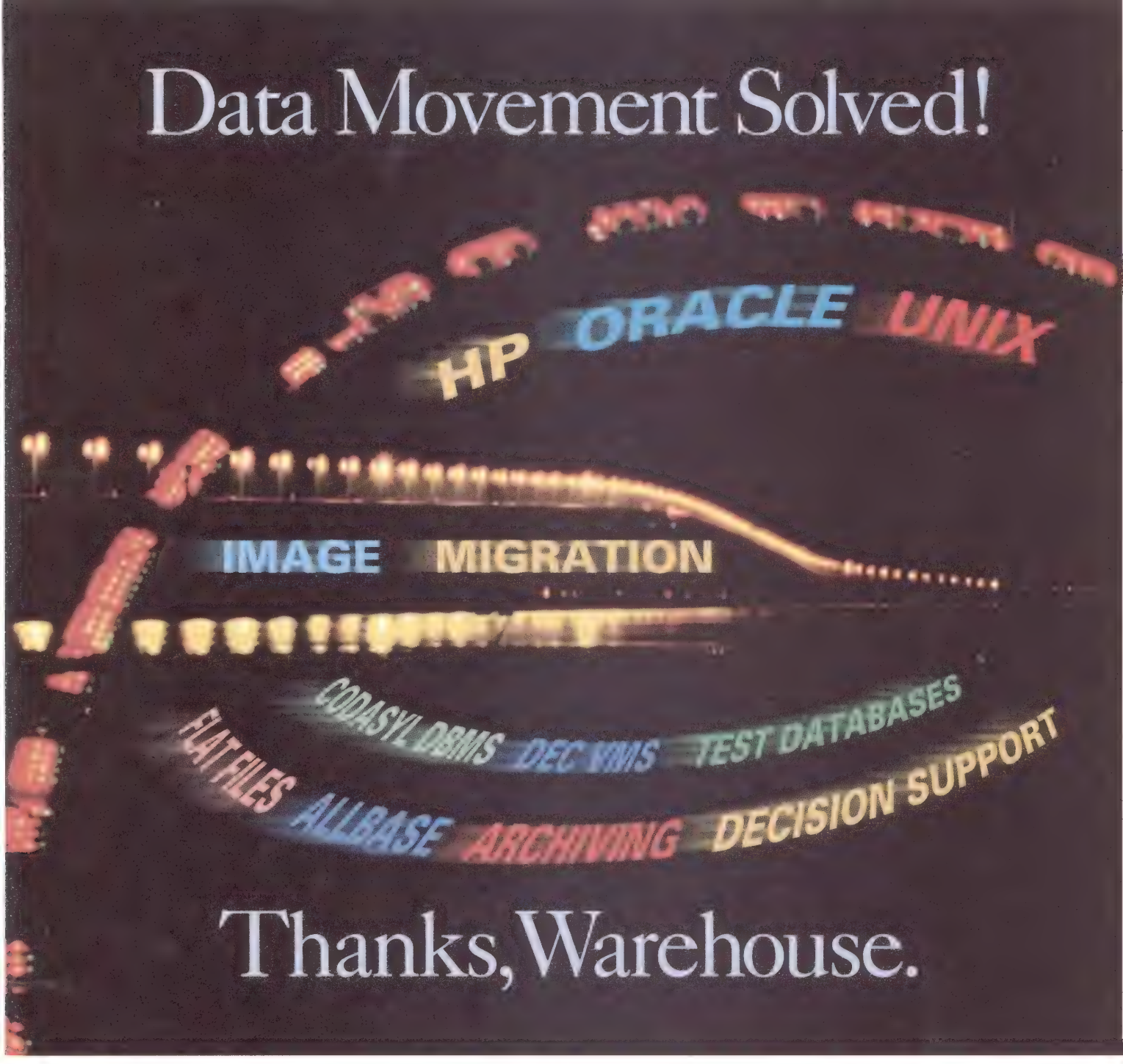
However, with the use of a patch and a linker option, it is possible to combine quadrant 1 and 2 in a process's virtual address space. This is known as an EXEC_MAGIC executable. This will allow a combined total of roughly 2 GB for a process's text and data segment. The patch is currently PHKL_5048. The linker option is *-N*. However, an EXEC_MAGIC executable cannot share its text segment at 9.x. Consequently, this may cause increased memory utilization.

At 10.0 and 10.01, no patch is needed to remove the 1-GB restriction on an EXEC_MAGIC executable. However, the limitations of this type of executable remain.

At 10.10, many of the restrictions have been removed. For instance, unmodified text pages are shared. Also, the text area of EXEC_MAGIC executables is demand paged instead of entirely loaded at exec() time. ◧

General HP-UX and 9000 questions are answered by Bill Hassell, a support engineer at the HP Atlanta Response Center. He can be contacted via e-mail at blh@hpuerca.atl.hp.com.

Workstation questions are answered by Susan Potter, an HP-UX system support engineer in the Atlanta Response Center. Her e-mail address is sup@atl.hp.com.



Warehouse does two things. Move and manipulate data. Almost anywhere. No programming needed.

If you need to cross HP, UNIX or VAX platforms. Or move between Image, Oracle, DBMS and other databases or applications. No problem. If you need to migrate legacy data across the network straight into relational databases. Done. It arrives as native data.

Data warehousing is just as easy. In minutes, you can archive and retrieve selected data from any media. Make test and decision support databases. Think of the advantages. No downtime. No big intermediate flat files. And total platform transparency.

Hundreds of companies depend on Warehouse. And Taurus is a certified "HP User Reference" company as well as a participant in the "Oracle Business Alliance Program." So if you move data, now theres a real solution. Warehouse from Taurus.

Call today for details.

Taurus Software
1032 Elwell Court, Palo Alto, CA 94303
Phone: 415-961-1323 x100 • Fax: 415-961-1454 • E-mail: sales@taurus.com

CIRCLE 134 ON READER SERVICE CARD

System Administration

by Chris Curtin

Hewlett-Packard's New Software Update Procedure

THIS MONTH I AM GOING to describe the new software update procedure HP introduced in April of this year. Basically, HP is moving toward the World Wide Web as an information delivery vehicle for software updates and patches.

SUM–Software Update Manager

HP has introduced a Web browser-based tool called Software Update Manager (SUM for short). This tool allows the user to query HP Web sites for real-time information about the products in their support contracts. Now you can find out about updates to products that interest you long before HP sends you update notices.

As I write this (mid-April) the SUM software hasn't been released yet. I am basing this description on some literature I received from HP. As soon as I get a copy of SUM, I'll provide a detailed description of its functionality. Maybe next time.

As the update process works now, you receive an update package, usually a DAT or CD-ROM, every two months. Included in the package is a list of the updated software on the media and a list of the current releases of all HP products. You will not receive a package unless one of the products you have support for has been updated.

Starting in April, HP will no longer be automatically shipping packages to all support customers. Instead you will receive a letter describing the update and asking if you want to receive it. According to HP, a yellow sticker placed on the envelope will read

NEW RELEASE AVAILABLE–RESPONSE REQUIRED.

This is your only clue that a new version of one of your products is available.

In order to provide the same information as in the "old way," HP is putting the current release information on the Web. This is where SUM comes into the picture. Unlike the old revision sheets, SUM will provide information about the release. According to the literature I have, SUM will provide the following: "What's New In This Version," "Compatibility and Installation Requirements," and "Known Problems and Workarounds." This is a lot better than trying to install a new release before knowing what was changed (or what was broken...)!

HP hopes that this information will help you to make informed decisions about what revisions of products to install.

CD-ROM Delivery

Since early last year HP has been telling everyone that CD-ROM is going to be the delivery mechanism of choice on all new machines. Starting in April, HP has standardized on CD-ROM as a delivery mechanism for all software. While you can request software on other media, it will take longer to arrive than the CD-ROMs.

My advice: If you don't already have a CD-ROM drive for your system, get one. It is much easier to keep track of a couple of CD-ROMs than a dozen DAT or 9-track tapes. They are also less likely to get damaged.

Also starting in April, with the official release of HP-UX 10.10, the CD-ROM code words are no longer linked to the hardware ID of the system on which you are installing them. The new code word is based on your support contract identifier.

Preparing for 10.10

As I indicated above, HP released HP-UX 10.10 in April. If you are like me, you probably don't trust "dot zero" releases of anything and waited for the next release. As I am writing this, I am looking at the 10.10 package for my E55.

Okay, I have the release, now what? Hopefully you have read the articles and columns of the other authors in this magazine and realize that HP-UX 10 is dramatically different from 9.x. The most obvious difference is the change in disk layout. See "First Looks at Release 10.0" by Bill Hassell in the July 1995 *hp-ux/usr* for a great description of the new layout and how it compares to 9.x.

The first thing you should do is contact the vendors whose software or hardware you use to see if they support HP-UX 10. A quick poll of the vendors I use showed about half have 10.x native applications, and most of the others said they have tested their 9.x executables on 10.x and everything seemed to work. Luckily the non-native applications are not critical to our operation.

Next I'd verify that the package HP sent me contains everything I am supposed to have. A couple of times in the past HP has forgotten to send a code word for my C++ compiler. Since my company has about 200,000 lines of C++ code in our applications, the upgrade is useless without the compiler. (Yes, they did it again this time too.)

Finally, I'd look at how my system is being used today. Since you are going to want to install HP-UX 10 instead of upgrading to it, take this time to change your swap or disk layouts if necessary. Looking at my system I know that the swap space is okay, but the disk layout leaves a lot to be desired. When the system was designed a couple of years ago, I made allowances for growth in several databases and directories that never materialized. Instead several other directories grew faster than expected. When I install 10.10 I am going to size the disk partitions (LVM volumes) accordingly.

Unfortunately I haven't installed 10.10 yet, so I can't warn you of any potential problems. I have read the release notes and it appears that HP has provided some useful tools to aid in the upgrade process. Look for information about these tools if you need to upgrade soon.

Internet Stuff

Back in the September 1994 issue I reported the location of the archives for the HP-UX System Administration mailing list. Bart Munzer, the owner of the list, has moved it. It is now located at *http://hpux.ced.tudelft.nl/HPUX_ADMIN_ARCHIVE*. It can also be accessed via ftp at *ftp.cv.ruu.nl:/pub/digests/hpux-admin*.

There is also a "fuzzy" search engine on the archives now. Point your browser to *http://www.nexial.nl/cgi-bin/hpsysadmin* and search for your problem or question. Most likely, someone has encountered it before and the solution is probably in the archive.

Finally, last time I recommended checking out the UNIX Guru Universe site (*http://www.ugu.com*). They have started an e-mail newsletter titled *UGU GOOZETTE: A 2 Minute News Letter*. It contains quick tidbits of information about System Administration and references of where to get additional information. Subscriptions are available at the site.

That's it for this time. I hope I'll have some 10.10 information and SUM information next time. Keep the e-mail and suggested Web sites coming. ◧

Chris Curtin, a software developer for Bradley Ward Systems, Inc. in Atlanta, Georgia, specializes in device driver development for factory automation on the HP 9000. He can be reached via e-mail at: chris@bwilab3.atl.ga.us.

Interex Presents

HP WORLD '96

See hundreds of exhibitors!

The Conference & Expo for Hewlett-Packard Computing Solutions

Keeping You A Step Ahead

Conference

- Hands-on solutions
- Peer-to-peer interaction
- Expert optimization techniques
- Real-world migration tips

Expo

- Create high availability solutions
- Improve high-end performance and scalability
- Develop migration strategies
- Learn about new technologies
- Make the right purchasing decisions

August 4-9, 1996
Anaheim, California
Anaheim Convention Center

Sponsored and managed by the Association of Hewlett-Packard Computing Professionals (Interex).

Get HP WORLD '96 registration and "Free Expo Pass" information!

See us on the WWW at http://www.interex.org/

Call an HP WORLD '96 Conference Representative at 1.800.990.EXPO
or e-mail us at conference@interex.org.

Series #1

Keeping You A Step Ahead

ANAHEIM HP WORLD '96 Conference & Expo

News

August 4-9, 1996
Anaheim Convention Center

How Do You Design a Distributed Computing Environment That Gives You the Best of HP-UX, MPE, Windows NT, and the Internet?

Today's plethora of system choices is both a blessing and a curse for IT professionals who are struggling to optimize and integrate their systems into a unified, heterogeneous whole. How do you realize the full power of HP-UX, the flexibility of NT, and the functionality of MPE, and give your end users the Internet access they require? Learning how to set up this kind of reliable and manageable interoperability is a necessary step in creating a successful enterprise environment.Fortunately, the HP WORLD '96 Conference & Expo is designed to help you face this challenge and make the right system decisions for your operating environment. From high availability and migration issues to data warehousing and the Internet, the time-critical and targeted information you need will be available — information you can immediately implement in your own environment. You'll hear from top industry experts as well as other HP computing professionals who have already experienced these challenges. They'll explain the pitfalls to avoid and outline best practices on all of these issues and more.

Additionally, you can explore the best new technologies on the Expo floor and network with HP-related vendors who can help you implement the information you have gathered during conference sessions and through peer-to-peer interaction.

Who should attend HP WORLD '96

Anyone who works with HP computing technology at any level, including:

- Software Developers
- Programmers
- System Integrators
- Network/Operations Managers
- Information Systems Managers
- Service Providers
- Buyers and Resellers
- Consultants
- HP Personnel
- Corporate Managers
- PC Specialists
- Distributors

Here's just a sample of the tutorials & presentations you'll find at HP WORLD '96:

- Building High Availability Systems for Maximum Uptime
- HP's Server Positioning from an HP-UX and Windows NT Perspective
- HP's Internet Solutions for Today and Tomorrow
- How to Design a Distributed Computing Environment to Maximize Overall Performance
- HP OpenView: An Overview
- Integrating Your Applications with the World Wide Web
- HP-UX Networking in an MPE/iX Environment
- Client-Server Foundation: In-Depth
- Database Administration for Client-Server Computing
- Delivering Database Access from the World Wide Web
- Strategic Information Systems Planning
- How to Design, Implement, and Manage an Open, High Availability Solution
- Constructing a Data Warehouse May be Easier Than You Think

For more information about HP WORLD '96, consult your conference brochure. If you haven't received a copy, access us on the WWW at http://www.hpworld.org/, or call us at 1.800.990 EXPO (outside the U.S. 1.408.747.0227), or e-mail us at conference@ interex.org.

Training Seminars

Monday, August 5
Get the practical, hands-on training you need on critical computing issues

Typically sold out weeks in advance, these information-critical seminars are, for many, the most valuable seminars of the year. This year the seminars will address topics such as:

1. Building a Web Site
2. Using Information Technology for a Competitive Advantage
3. Network and System Management for HP-UX 10.0
4. Distributed Computing Technologies and Products
5. Positioning, Configuring, and Interoperating in a Heterogeneous UNIX/Windows NT Environment
6. HP-UX and Internet Security
7. Data Warehousing
8. Second-Generation Client-Server Technology
9. Introduction to Visual Basic
10. Creating Market-Focused Products
11. Enabling Technologies for Supply Chain Management

HP WORLD '96 Conference Expanded

Interex, the International Association of Hewlett-Packard Computing Professionals, has announced that due to increased attendee interest, a number of key HP WORLD '96 conference tracks have been expanded. Consequently, additional emphasis will be placed on UNIX issues in both conference programming and exhibits. The UNIX program includes course topics such as UNIX Bootcamp, HP-UX and Internet Security, 10.0 Management, Data Warehousing, and Distributed Computing Environment.

HP WORLD '96 will also feature courses addressing Windows NT. These courses will instruct HP WORLD attendees on how to successfully migrate to this popular operating system and how to maximize its potential within their computing environments.

Conference tracks at HP WORLD '96 include Development Technology, Networking Technology, Operating Systems/Hardware Technology, Database Technology, and HP Computing Management. Within these tracks, presentations that address one or more of the following strategic concerns will be highlighted: Open Systems Standards, Enterprise Computing, Client-Server Computing, and High Availability.

This year, the conference will include HP's Personal Information Products Group (PPG). PPG, which encompasses both PCs and peripherals, is scheduled to participate extensively in the conference program as well as have a significant presence on the exposition floor. The addition of PPG will provide attendees with hands-on opportunities to explore and learn more about PC and peripheral options for their computing environments.

HP WORLD '96 is the largest annual North American HP-focused event where computing professionals can get both HP-related training and new product exposure.

Management Symposium

New Program

Monday, August 5
A day devoted to helping you better manage time, information, and people

Due to overwhelming demand, Dr. James Wetherbe will headline HP WORLD's Management Symposium for the second year in a row. Bringing his vast information system experience to the topics of innovative management strategies and motivating the information systems professional, Wetherbe will spend an entire day enlightening you on these critical areas. Seize this chance to learn how to better manage people, time, and information. For more information on this program, consult pages 8 - 9 in your conference brochure.

Conference-at-a-Glance

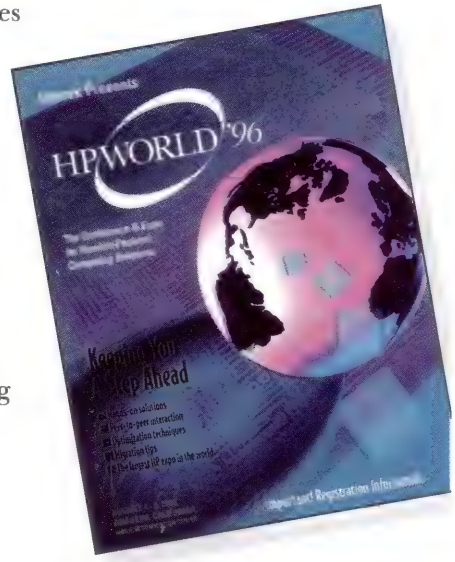
August 4	August 5	August 6	August 7	August 8	August 9
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Manufacturing Conference	Management Symposium Training Seminars	Main Conference Exposition			Conference closes at 12:30 pm

Manufacturing Conference

New Program

August 4 – 8
A conference for users of business applications running on HP systems

Learn how to use technology to enhance productivity and solve business problems in your manufacturing environment. If you are engaged at any level in a manufacturing environment, you can't miss the Manufacturing Conference. This newly expanded five-day event is a conference-within-a-conference. By running concurrently with HP WORLD '96, the Manufacturing Conference will give you all the benefits of both. Virtually everyone involved in manufacturing will gain valuable skills by attending this unique annual conference. Refer to pages 4 - 7 in your conference brochure.



Keep Your Company A Step Ahead, Keep Your Career A Step Ahead...

Conference Keynotes

Gather high-level perspectives from industry leaders & insiders

Lew Platt
President and CEO
Hewlett-Packard Co.
Tuesday, August 6
8:00-9:00 am

Hewlett-Packard is involved in almost every aspect of the communications revolution — an era characterized by the almost universal movement to digital media, ubiquitous connectivity, and price points that have brought technology into mass markets.

What's HP's approach to the Internet? To network security and management? What technology advances will make it possible to access large graphics and video files over the network more rapidly? Will an open systems philosophy guide the development of the emerging information infrastructure? Platt's presentation will review these and various other aspects of the communications revolution.

Rick Belluzzo
Executive Vice President and General Manager Computer Organization
Hewlett-Packard Co.
Tuesday, August 6
8:00-9:00 am

In enterprises around the world, customers are asking for help in managing mixed computing environments — including those working with both UNIX and NT. With a strong position in both the enterprise/server world and the desktop/PC world, in 1995, HP signaled its intention to help customers integrate their worlds by unifying its computer activities under the leadership of Rick Belluzzo. Belluzzo will describe the priorities his new organization has embraced and the progress made thus far in achieving them.

For more information on these sessions, consult pages 20-24 of your HP WORLD '96 Conference brochure.

Humor at Work
Scott Adams
Syndicated Cartoonist
Dilbert Comic Strip
Monday, August 5
6:30-7:30 pm

Published in over 1,000 papers in 23 countries, the Dilbert comic strip taps into the humor found in the business, and to a large extent, the technical work environment. In this presentation, Dilbert's creator, Scott Adams, will relate the strange journey of how he came to be a cartoonist and his formula for writing humor. Adams will also show cartoons that didn't make it past the editors (rated PG) and take questions from the audience. This presentation is designed for fun and entertainment.

Managing Client-Server Computing
Cheryl Currid
President
Currid & Company
Friday, August 9
9:00-9:50 am

Client-server technology, arguably the most important technology of the decade, can unlock great promise and potential with today's open computing environment. Correctly deployed, it lets companies develop applications faster, better, and smarter than traditional methods. It both supports and creates new business opportunities. But, client-server doesn't work for everyone. The path is littered with problems that could have, and should have, been avoided.

Cheryl Currid's keynote address marks the potholes to be avoided on the way to the promised land. She provides a high-level road map showing the way to success with correct infrastructure, development tools, and operational processes. She pokes fun at a few of the old development paradigms and shows strategies that work.

Plenary Sessions Schedule

High-level HP Managers reveal their short- and long-term strategies

Tuesday, August 6

Carol Mills
General Manager
General Systems Division
Staying Ahead in the Real World
10:00 - 10:50 am

Harry Sterling
General Manager
Commercial Systems Division
Strategies for Customer Success
2:00 - 2:50 pm

Wednesday, August 7

Mark Canepa
General Manager
Workstation Systems Division
Leadership Solutions for Enterprise Technical Computing
8:00 - 8:50 am

Olivier Helleboid
General Manager, Network & System Management Division
HP OpenView Strategic Directions
10:00 - 10:50 am

Duane Zitzner, *General Manager, Personal Information Products Group*
Strategic Directions for HP's PCx 86-based Servers and PC Networking Products
2:00 - 2:50 pm

Thursday, August 8

Lane Nonnenberg, *Sales & Marketing Manager, Worldwide Customer Support Operations*
Achieving Customer Satisfaction in Today's World
8:00 - 8:50 am

Dick Watts, *Vice President and General Manager, Computer Systems Organization*
HP's Computing Strategy – Keeping You A Step Ahead
10:00 - 10:50 am

HP-UX

Bug Trapping in Korn Shells

by David L. Totsch

As a system administrator, I write shell scripts because of one or more of the following human characteristics:

- basic laziness
- inherent inconsistency
- random forgetfulness

When I started writing shell scripts, I had the luxury of writing them to compensate for my own human nature. Lately, I have been writing shell scripts for a much wider (and more scrutinizing) audience. Suddenly, I find myself having to account for yet another basic human characteristic: blame! For some reason, the first three characteristics do not apply to humans seeking out those they blame. Occasionally, my self-preservation instinct has to kick in. First, I strive to put into the hands of others only shells that do not break. Otherwise, I urgently work to repair quickly those that stubbornly refuse to work as intended. Fortunately for those of us writing shell scripts, this two-pronged approach embodies the same set of techniques:

- standard programming skills
- shell command-line arguments
- signal trapping

In the realm of "standard programming skills," we rely a great deal on echo/print statements. Printing such statements as "Got this far..." and the contents of variables we learned during the first days of our programming infancy. The *tee(1)* command is helpful for figuring out problems with long, complicated, even obtuse, pipelines. Throwing in an exit statement just before a shell does something critical that you want to skip during debugging is a good idea, too. But, alas, those techniques take us only so far and can still leave us perplexed by nasty coding problems.

Shell debugging can be taken another step farther by using some of the command-line options to the shell. (Some of these techniques can be used in Bourne and POSIX shells.) Here are some of the Korn Shell command-line options I find useful:

-v Line Trace

This option prints a copy of each unexpanded line of the shell script to standard error just before it is executed. Comments are also printed.

-x Execution Trace

This option prints a copy of each expanded line of the shell script just before it is executed, preceded by *PS4*, to standard error. To precede the lines with line numbers, set *PS4* to:

```
PS4='${LINENO}: '
```

Note that the single-quotes are important–they prevent the shell from interpreting *${LINENO}* before *PS4* is set. If you leave them out, or use double-quotes, *PS4* will be set to be a constant value–what *${LINENO}* happened to be when *PS4* was set.

-vx Combination Trace

You get the unexpanded and then the expanded version of each line.

-e Immediate Exit on Command Failure

The shell exits whenever a command's exit status is non-zero.

-u Reference to Unset Named Parameters is Error

This helps track down a variable that is not set. This is of no use if the variable is set to NULL.

-n Do Nothing

Actually, this is more useful than it sounds. It reads commands and checks for shell syntax errors. Warning: it does *not* find run-time or command-line argument errors.

Listing 1.1 is the contents of the file *eg.ksh*. This shell script sets a variable to the current time, prints out some text, waits five seconds, prints what the user is doing, tries to catch itself in the Process Stack, prints the current time again, and exits.

Listing 1.2 is the output running *eg.ksh* in Line Trace mode. *Listing 1.3* is the output running *eg.ksh* in Execution Trace mode.

Rather than watch entire shells execute with the command-line parameters set (epecially interactive shells), use the set command to turn them on and off. *Listing 2.1* is again the contents of *eg.ksh*, but I have added the set command on line 18 to turn on Execution trace and added it again to turn it off on line 21. *Listing 2.2* is the output simply running the shell.

Notice that we did not catch the shell script itself running in the second *ps* statement. Why is that? Replacing the line

```
ps -t${TTY##*/} | grep ${0}
```

with

```
ps -ft${TTY##*/} | tee ps.out | grep ${0}
```

LISTING 1.1 */usr/tmp/eg.ksh*

```
1   #!/bin/ksh
2   ####### This is an example Korn Shell
3
4   MYVAR0=$(date +%X)
5
6   echo "This shell started at ${MYVAR0}"
7
8   sleep 5
9
10  ####### See what this user is doing...
11  ps -fu$(id -n -u)
12
13  echo ------------------------------
14
15  #######   See if we can catch this program
16  ####### running on the current tty...
17
18  TTY=$(tty)
19  ps -t${TTY##*/} | grep ${0}
20
21  echo "\n\nThis shell completed at $(date +%X)"
22  exit 0
```

reveals that the *ps* command actually does catch the shell script running. A close look at the output shows that the path name to the shell script is not being reported by *ps*, only the command name itself (in this case, *eg.ksh*). Our execution trace clearly shows that we are passing the full path name to *eg.ksh* as the argument for the *grep* command. Therefore, to fix this bug, we need to use the basename of ${0}. Replace the line with:

```
ps -t${TTY##*/} | grep ${0##*/}
```

and the shell script behaves as advertised.

If you have written many interactive shell scripts, you have probably already familiarized yourself with trapping external signals, such as SIGQUIT, to prevent users from bailing out of the shell at crucial points. The Korn Shell has some very useful internal signals:

DEBUG	execute the associated routine after each line
ERR	execute the associated routine upon any non-zero exit status from a command
EXIT	execute the associated routine upon exit

Here is a trap that you may find useful not only for debugging, but as a standard part of your shell scripts:

LISTING 1.2 *Line Trace*

```
#!/bin/ksh
####### This is an example Korn Shell

MYVAR0=$(date +%X)

echo "This shell started at ${MYVAR0}"
This shell started at 21:10:04

sleep 5

####### See what this user is doing...
ps -fu$(id -n -u)
     UID   PID  PPID  C    STIME TTY      TIME COMMAND
 bogusid  6937  6890  0 21:10:04 ttyp2    0:00 /bin/ksh -v /usr/tmp/eg.ksh
 bogusid  6890  6889  0 20:47:36 ttyp2    0:00 -ksh
 bogusid  6941  6937  6 21:10:09 ttyp2    0:00 ps -fubogusid

echo ------------------------------

#######   See if we can catch this program
####### running on the current tty...

TTY=$(tty)
ps -t${TTY##*/} | grep ${0}

echo "\n\nThis shell completed at $(date +%X)"


This shell completed at 21:10:09
exit 0
```

LISTING 1.3 *Execution Trace*

```
+ + date +%X
MYVAR0=21:10:54
+ echo This shell started at 21:10:54
This shell started at 21:10:54
+ sleep 5
+ id -n -u
+ ps -fubogusid
     UID   PID  PPID  C    STIME TTY      TIME COMMAND
 bogusid  6947  6890  0 21:10:54 ttyp2    0:00 /bin/ksh -x /usr/tmp/eg.ksh
 bogusid  6890  6889  0 20:47:36 ttyp2    0:00 -ksh
 bogusid  6951  6947  6 21:10:59 ttyp2    0:00 ps -fubogusid
+ echo  ------------------------------
+ + tty
TTY=/dev/ttyp2
+ grep /usr/tmp/eg.ksh
+ ps -tttyp2
+ date +%X
+ echo \n\nThis shell completed at 21:10:59


This shell completed at 21:10:59
+ exit 0
```

```
trap 'BADSTAT ${LINENO}' ERR
```

This trap will run the function BADSTAT with an argument of the current line number whenever a command has a non-zero exit status. Note that you should enclose the associated routine in single quotes to avoid expansion as the trap is set. The associated routine may be a single command, several semicolon-separated commands, or a function call. Here is the function BADSTAT:

```
BADSTAT()
{
ES=${?}
echo "Command at line ${1} \c"
echo "failed with a status of ${ES}"
}
```

If you consistently redirect standard error to the same temporary file (not in append mode) throughout your program, this function can also print the contents of the error file for extra assistance in the debugging process.

Combining some of our standard programming techniques with a trap, we have another useful technique:

```
trap 'DeBugger ${LINENO}' DEBUG
DeBugger()
{
echo "${1}: Parameters are:"
echo "\tPARM=${PARM}"
echo "\tMYVAR=${MYVAR}"
}
```

Now you can quit typing all of those echo statements inside your code just to discover a minor error and you can direct the output to a debug log file instead of the screen if you wish. Also, you may want to see the named parameters printed for certain lines of code.

SOLID GOLD CONNECTIVITY

Now you can access any mainframe file platform application or operating system. From any desktop.

PERICOM
US, UK, GERMANY, FRANCE

2271 State Highway 33, Suite 106
Hamilton Square, NJ 08690
Phone: (609) 588-5300
Fax: (609) 588-8906
BBS: (609) 895-0767
email: sales@pericom-usa.com
Sales: 1-800-233-2206

CIRCLE 97 ON READER SERVICE CARD

LISTING 2.1 *Using the* **set** *command*

```
1   #!/bin/ksh
2   ####### This is an example Korn Shell
3
4   MYVAR0=$(date +%X)
5
6   echo "This shell started at ${MYVAR0}"
7
8   sleep 5
9
10  ####### See what this user is doing...
11  ps -fu$(id -n -u)
12
13  echo  ------------------------------
4
15  #######   See if we can catch this program
16  ####### running on the current tty...
17
18  set -x   ####### Turn on  Execution Trace
19  TTY=$(tty)
20  ps -t${TTY##*/} | grep ${0}
21  set +x   ####### Turn off Execution Trace
22
23  echo "\n\nThis shell completed at $(date +%X)"
24  exit 0
```

LISTING 2.2 *Output Running* **eg.ksh**

```
This shell started at 21:13:54
     UID   PID PPID C    STIME TTY   TIME  COMMAND
 bogusid 6986 6890 0 21:13:53 ttyp2 0:00  /usr/tmp/eg.ksh /usr/tmp/eg.ksh
 bogusid 6890 6889 0 20:47:36 ttyp2 0:00  -ksh
 bogusid 6990 6986 6 21:13:59 ttyp2 0:00  ps -fubogusid
 ------------------------------
19: 19: tty
TTY=/dev/ttyp2
20: grep /usr/tmp/eg.ksh
20: ps -tttyp2


This shell completed at 21:13:59
```

Place the trap just before the block of code you want to inspect. To disarm the trap, place the following statement

```
trap - DEBUG
```

after the block of code.

Trapping EXIT is another technique you might want to use as a standard part of your shell scripts. I use it to have a central exit point for all of my shell scripts. Doing so makes it simple to clean up temporary files and perform other house keeping tasks.

Although the adage "there is no such thing as a finished shell script" will apply to the majority of the shell scripts you write (as it does to mine), using the modest debugging techniques described above should prevent them from slipping into the "broken" category. And, when those shell scripts do suddenly slip into that category, these same techniques can be deployed for debugging to minimize the amount of time we are viewed unfavorably by those we affectionately call "users." ◧

After serving several different organizations over the past seven years as a system administrator with various flavors of UNIX, David L. Totsch still enjoys the profession. He also enjoys discussing UNIX with just about anyone. At present, he is working with HP-UX systems and wide-area networks for a Fortune 100 company in the Piedmont area of North Carolina. He can be reached via Internet: dtotsch@wfu.edu.

Serial Data Communications: HP/UX 10.X and

The Important Changes

Illustration by Karen Tokmakoff

by John A. Pezzano

The introduction of the HP-UX 10.0 New Business Release and the 10.01 General Business Release of the HP-UX operating system for the HP 9000 Series 800 Business Servers and Series 700 Workstations included some important changes for serial data communications. These changes will affect administrators of systems that have modems for dialin or dialout, those who use (or may now wish to use) UUCP, SLIP or kermit, and those concerned with security on their serial connections.

getty and *uugetty* Changes

Both *getty* and *uugetty* now understand the hardware flow control (RTS/CTS) parameters RTSXOFF and CTSXON. At the 9.x version of HP-UX, *getty* did not understand either of these parameters and ignored them. The patched version of *uugetty* did understand them. However, because of the differences in the *getty* programs and because *cu(1), ct(1), kermit(1),* and *uucico (1M)* did not have any capability of setting these parameters, the North American Response Center recommended that the user implement hardware flow control by setting the appropriate bits in the minor number. This recommendation still stands because of the limitations of *cu(1), ct(1),* and *uucico(1M),* which cannot themselves set these parameters.

Modem Connections

The best news for those who use modem connections is the support for higher serial port speeds. While the software drivers and hardware on serial ports on the Series 700 Workstations supported baud rates up to 460,000 baud, the HP-UX operating system programs such as *getty, uugetty, kermit,* and *cu* limited the user to 38k baud. As of 10.0, these programs have been enhanced to support the full hardware capability. This is important for those desiring newer modems that support 28.8K baud. Such modems, with compression enabled, can provide an effective throughput up to 115k baud. Prior to 10.0, the user was limited by the programs' 38K capability.

This doesn't mean that one will suddenly experience data being displayed at blinding speeds when dialing in via modem. The old 2400 baud modem will still run only at 2400 baud. The user's typing speed, the hardware limitations of the various devices, modem line noise, etc., all contribute to limiting the effective throughput. However, it does mean that such things as SLIP connections, kermit file transfers, and display listings will at least not be limited by the system-supplied programs.

For Series 800 Business Servers, there is still a hardware speed limitation on existing modem multiplexers. These are limited to 19200 or less for modem multiplexers and 38K for those supporting only hardwired devices.

The new D Class servers support the EISA multiplexers with speeds up to 115K baud, full modem control, hardware handshaking, and 64 ports on a single interface. In addition, there is a diagnostic utility for observing port configurations, resetting single ports, checking data, and testing I/O. Unlike the other multiplexers, these ports are configured to be true DTE and use industry-standard straight-through cables for connections to modems.

Kermit

HP-UX now supports the recently introduced Columbia University C-Kermit 5A (190) revision. This version provides considerable enhancement in both features and performance over the previous supported kermit.

This version of kermit supports transmission over TCP/IP, has a much more powerful script language than the previous version, supports both systemwide and personal customizations, and has the capability of defining macros and many other features.

Unlike the previous version of kermit provided with HP-UX, the 10.0 version comes with numerous sample, customization, and information files in the directory */usr/share/lib/kermit.* However, support now rests with Columbia University and I highly recommend that those desiring to use kermit purchase the book *Using C-Kermit,* by Frank da Cruz and Christine M. Gianone of Columbia University.

My experience playing with the 5A version is that the ability to set "window size" has affected the speed with which

files are transferred via modem between an HP-UX system and my PC at home. I have experienced throughput increases up to ten times that which I previously received with the HP-UX 9.X C-Kermit 4E.

Because the new kermit comes with many scripting features, numerous kermit scripts available on the Web provide communication to both numeric as well as alphanumeric pagers. Many customers have tried to use *cu* or *kermit* in the past to activate pagers (and a few have even succeeded). This is a welcome feature of *kermit.*

New *stty* Features

The *stty* command now supports a number of new parameters. These include:

imaxbel	echo a BEL character when input line is too long
echoctl	enable echoing of control characters as ^char rather than as the actual control character
echoprt	echo the erase character as a character is erased
echoke	erase each character by doing a BS-SP-BS on the entire line on a line kill
flusho	flush output
pendin	retype pending output at next read or input character
werase	erase previous word

Default *stty* Parameters for Serial Ports

The system administrator is now able to provide a systemwide serial port default for *stty* parameters. Prior to 10.0, parameters such as ERASE and KILL were set to the original UNIX defaults, which assumed the user's terminal might not have nonprinting control characters. This caused a lot of confusion. Unless the parameters were changed in the */etc/profile* (or */etc/csh.login*) or the user's *.profile* (or *.login*) file, they kept these defaults. Thus, the line kill, which is the default @ character, was changed after login and the user found that an attempt to send mail to an Internet-style address suddenly caused the whole line to disappear. In addition, there was no way to set defaults before login. Therefore, the initial login and password parameters had to be entered with the standard defaults.

By setting the values in the file */dev/ttyconf,* the administrator can now provide automatic systemwide defaults simply and quickly. To set a particular parameter, just type:

```
stty parameter </dev/ttyconf
```

For example, to set ERASE to <control>H (written as ^H), type

```
stty erase ^h </dev/ttyconf
```

The next time a user logs in to any port, the new parameters will be set. Note that the system console does not have its parameters changed until the next reboot. To view the contents of the file */dev/ttyconf,* type

```
stty -a</dev/ttyconf
```

Port Lockout

HP-UX 10.0 provides a feature known as Commercial Security, which is a subset of the HP-UX B1 Level Secure UNIX. If the "Trusted Systems" feature is turned on, the system administrator can now cause a serial port to be locked out after a predefined number of unsuccessful login attempts (default 10), can set the delay time between logins to slow down a potential attacker, can set a time-out for successful login to a port, and can define which users may log onto a particular port. This can be useful for protecting "local" ports on the factory floor or in unsupervised areas to limit hackers as well as to better secure dialin ports. Each of these features can be defined on a systemwide or individual port basis with SAM's security definitions.

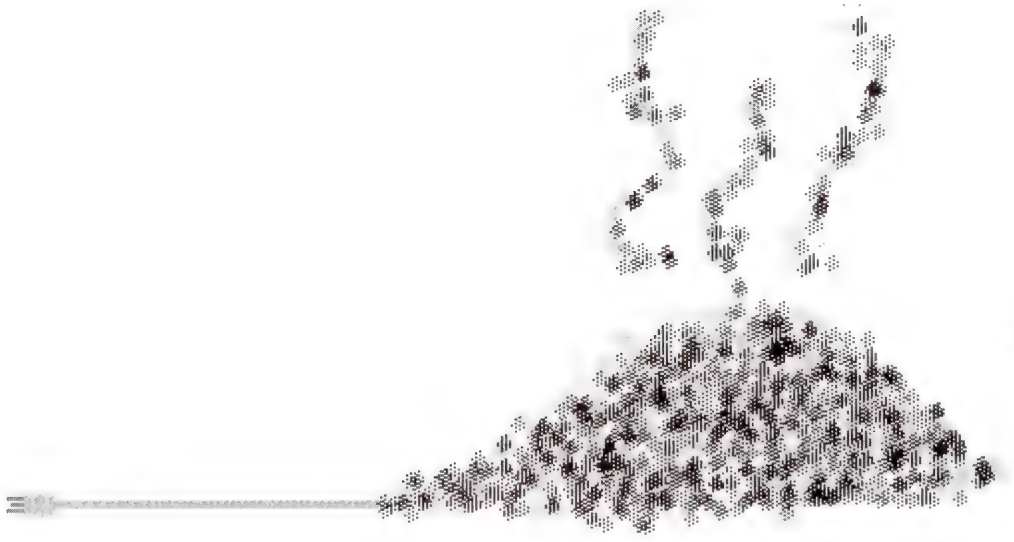
Such limitations are not always useful. A malicious unauthorized user might simply intentionally type some random characters and carriage returns a few times and thus lock out a port. Thus while that person cannot get in, neither can a legitimate user until an administrator unlocks the port with SAM. The malicious user might intentionally continue to lock up a port until the administrator gets so frustrated that the feature is disabled. Administrators may want to consider this when deciding whether to implement port lockout.

The defining file for these features is */tcb/files/ttys,* and while it can be manually edited as it is an ASCII file, it is much more easily configured or modified with SAM.

UUCP Changes

UUCP (UNIX to UNIX Copy Program) is a powerful means of providing low-cost batch-oriented file transfer, remote command execution, and

Today's the day your overworked processor spontaneously combusts.



Are you prepared?

CLAM Associates can help you prevent the consequences of downtime. Power failures and surges cause 45.3% of data loss, but making your mission-critical applications continuously available is simple with CLAM Associates' MC/ServiceGuard Integration Services. Buying the software is the easy part; making it work for you is *our* part. We specialize in continuous availability solutions; our expertise in cluster architecture makes CLAM the most reliable source to integrate Hewlett-Packard's MC/ServiceGuard into your system. Call (617) 621-2542, e-mail marketing@clam.com or surf http://www.clam.com for more information on CLAM. Our quality services will provide peace of mind in a world where *anything* can happen.

CLAM Associates. Solutions for a strange, strange world.

CIRCLE 6 ON READER SERVICE CARD

mail delivery over dialup serial ports. It has been around for many years and is the poor person's networking, having preceded ARPA services. At 10.0, the location of the UUCP files changes considerably from the 9.X and previous versions. The files that were in */usr/spool/uucp* are now in */var/uucp* or in */var/spool*. The files that were in */usr/lib/uucp* are now in */etc/uucp* or */usr/lbin/uucp* and the programs in */usr/bin* are still there. Specifically:

	9.X LOCATION	10.X LOCATION
UUCP Configuration File (Systems, Permissions, Devices, etc.)	*/usr/lib/uucp*	*/etc/uucp*
Log and Error Files	*/usr/spool/uucp*	*/var/uucp*
Spool directory	*/usr/spool/uucp*	*/var/spool/uucp*
Lock Files	*/usr/spool/uucp*	*/var/spool/locks*
Public Data directory	*/usr/spool/uucppublic*	*/var/spool/uucppublic*
User Executables	*/usr/bin*	*/usr/bin*
System Admin daemons (*uucpd*)	*/etc*	*/usr/sbin*
System Admin executables (*uucico, uuxqt, uucheck*, etc.)	*/usr/lib/uucp*	*/usr/lbin/uucp*

At 9.X, a patch added support of UUCP over TCP via LAN connections for Series 800 Business Servers. As of 10.0, this support is extended to include Series 700 Workstations and it, of course, is now fully documented.

While the extension of UUCP to LAN connections doesn't seem like a serial datacomm issue, the advantage is that UUCP can now be used transparently between machines whether they are connected via a local LAN or use remote dialup modems. Thus system administrators who might have been reluctant to dive into UUCP setup for a remote machine connection may now find it worthwhile to take advantage of its many features, such as the ability to submit a request even if the remote is temporarily inaccessible and its system-based security for directory access and remote command execution.

Driver and Device Numbering Changes

The naming convention for Series 800 Business Servers has been slightly modified for all device files. The concept of Logical Units has been replaced by "Instances," although the device files look the same. Therefore the old

`/dev/tty<lu>p<port>` (e.g., `/dev/tty0p3` for LU=0 PORT=3)

has been replaced by

`/dev/tty<I>p<port>` (`/dev/tty0p3` for Instance=0 PORT=3)

The naming convention for devices for Series 700 Workstations has been changed to match that of the Series 800 Business Servers. Thus the old Series 700 format for a serial device:

`/dev/ttynn`

where *nn* was a two-digit ID, has now been replaced by the same

`/dev/tty<I>p<port>` (`/dev/tty0p1` for Instance=0 PORT=1)

as the Series 800s.

Both types of systems now support the Series 800 *mksf*(1M) command, which permits the definition of a port's characteristics (such as callin, callout, port number, etc.) by the use of words and/or options. In addition both now support the setting of hardware flow control by an option in the *mksf* command, a feature which was not supported by the Series 800 9.X version of *mksf*. In addition, the not well-documented hardware FIFO/transmit buffering of Series 700 serial ports can now be set with the *mksf* command. Previously, only manual creation of the device file with *mknod* permitted the administrator to turn on buffering.

Some of the new features of *mksf* include:

- *-f* Hardware flow control (RTS/CTS).
- *-i* Modem dialer. Cannot be used with *-l*.
- *-r* fifo-trigger
- *-x* xmit-limit

The driver major numbers have now changed for the Series 800 Business Servers and serial drivers now have a major number of 1 as for the Series 700s. The drivers for the systems have been modified to take advantage of multiprocessor systems.

SAM Changes For Serial Ports

The changes for SAM include the previously mentioned security features. The only other significant change is in the default *gettydefs* entry for direct connect ports. Previously, a port being set up defaulted to 9600, which was the modem 9600 7-bit even parity switchable entry. Modems still default to that value. Now, however, terminals default to the "H" entry, which is a nonswitching 8-bit, no parity entry. The use of the 9600 entry on hardwired ports caused considerable problems both

from the 7/even setup as well as from the effects of powering off or disconnecting terminals using this entry after logging off. This caused a "break" which was seen by the *getty* process as a request to switch to the next (300 baud) entry, making the terminal appear to be hung until reboot or killing the *getty* process.

At 9.X, when SAM created the *cua* device file for Series 700s, it was made a callout type device. For Series 800s, it was made a hardwired one. Now both are consistent.

Serial Line Internet Protocol

Serial Line Internet Protocol (SLIP) provides ARPA services over a serial line. For 10.X, SLIP has been enhanced for both 800s and 700s to support Van Jacobsen compression (CSLIP). While this was available at later 9.X releases of the Series 700s, this feature is new for the Series 800. CSLIP, when combined with the higher speeds supported by Series 700s and the new D class Series 800s, provides quite decent networking from one's home PC.

Summary

Numerous minor datacomm features make 10.X a big improvement over 9.X HP-UX for serial data communications. I have tried to summarize the features here and I believe they alone justify the effort of an upgrade. ◧

John Pezzano has been supporting the HP-UX operating systems for Hewlett-Packard for more than eleven years. He is the author of numerous articles on a wide variety of topics published in hp-ux/usr *and* Interact *magazines. Pezzano currently works for HP in Atlanta, where he is a member of the North American Escalation team supporting HP-UX. He specializes in serial data communications and system security.*

Software Review

by Kelley Fugelso

Finesse—A Tool for Building Graphical Applications

Introduction

UNIX ENVIRONMENTS HAVE become more graphical in nature with the advent of desktop interfaces such as HP VUE, OpenWindows, and the Common Desktop Environment (CDE). In contrast, the use of command-line-oriented UNIX shell scripts remains prevalent. One reason for this is that the UNIX shell is a powerful command interpreter, tightly integrated with the underlying operating system, which makes it a natural for system administration tasks and simple user applications. It can access and manipulate the file system directly, spawn processes, connect processes together, and capture and filter output. The UNIX shell provides extensive programming features including shell scripts, shell variables, command line arguments, command substitution, and programming constructs such as conditional execution, case selection, and iteration.

Another reason for the lingering need for command-line-oriented scripts is that simple tools for creating graphical applications in the UNIX environment have been slow in coming. When the X Window system first emerged, highly skilled Xlib and C programmers were the only ones capable of developing graphical applications for UNIX systems. User Interface Management Systems (UIMSs) such as UIM/X and Teleuse emerged to make the job of creating graphical applications easier, but these tools were expensive, complicated, and intended for professional Xlib/Xt/Motif/C developers.

Tools for developing graphical applications designed for "non-programmers" have been around for several years for the Macintosh and Windows (e.g., HyperCard, Visual Basic). These types of tools are finally here for the X11/UNIX environment. One such tool, Finesse, allows system administrators and "regular" users to create graphical applications quickly by exploiting their UNIX shell programming skills. Applications created using Finesse are *regular UNIX shell scripts* containing simple calls to Finesse "user commands." Because most system administrators are already experts in developing UNIX shell scripts, building graphical applications using Finesse can be amazingly fast and easy.

Finesse is a software product from CXSOFT, a business unit of Hewlett-Packard's Convex Technology Center. The version of Finesse reviewed for this article is 3.2.2, running under HP-UX 9.05 on an HP 9000/755. The same version of Finesse functioned identically under HP-UX 10.01 on an HP 9000/829 (K400).

Features

Interpreted Shell Environment for Building Graphical Applications

Finesse runs within the interpreted scripting environment of the UNIX shell–that in itself affords many advantages to graphical application developers. Because shell scripts are interpreted, there is no need to wait for compile/link cycles. Scripting languages have simpler syntax and require fewer lines of code than third-generation languages such as C and C++. Finesse supports the three most widely used UNIX shells: the Bourne shell (sh), the Korn shell (ksh), and the C-shell (csh), as well as the GNU-Bourne-Again shell (bash) and the TC-shell (tcsh). Support for Perl will be available with the next release of Finesse (4.0), due out in July of this year.

A Finesse script begins as any other shell script, with an invocation of the shell under which the script will execute. A Finesse initialization file is then sourced to define the Finesse user commands. To illustrate, consider the classic "Hello World" program implemented using the Bourne shell:

```
#!/bin/sh
. ${FINESSEPATH-/usr/local/finesse}/fsshinit
Fsopen
Fsdisplay -w "FsWindow -btype o;" -m "Hello World!"
Fsclose
```

The first line invokes the Bourne shell, and the second line initializes Finesse. The *Fsopen* command starts the Finesse application server and verifies that a valid Finesse license exists. The arguments to *Fsdisplay* specify the design of the window, where `-w` defines the actual window description, and `-m` adds a message to the window. The `-btype o` on the *FsWindow* command tells Finesse to include an "OK" button on the window. *Fsclose* closes the Finesse application server. The program listed above creates the window shown in *Figure 1.*

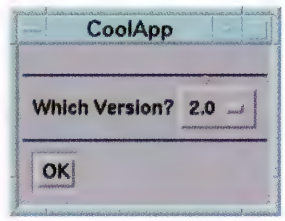
Finesse places user input to a Finesse application interface into shell variables, which may then be used in the same way as any other shell variables. As a simple example, suppose you have two versions (1.0 and 2.0) of a program named *CoolApp* available on your system, and you want one script to control the execution of both. You want to give users the choice of which version they wish to run, with Version 2.0 being the default. The Finesse script below is an example of an application to accomplish such a task. This program creates the window shown in *Figure 2.*

```
#!/bin/ksh
. ${FINESSEPATH-/usr/local/finesse}/fsshinit
windef="
        FsWindow        -btype o
                        -title 'CoolApp';
        FsSeparator;
        FsOptionMenu    -label 'Which Version?'
                        -items '1.0 2.0'
                        -var version=2.0;
        FsSeparator;"
Fsopen
Fsdisplay -w "$windef"
Fsclose
if [[ $version -eq 1.0 ]]; then
   /usr/local/coolapp_1.0/bin/coolapp
else
   /usr/local/coolapp_2.0/bin/coolapp
fi
```

In this example, the variable *windef* contains the window definition, which is passed to the *Fsdisplay* command with the

FIGURE 1

FIGURE 2



At-a-Glance

Finesse 3.2.2
CXSOFT
P.O. Box 833851
Richardson, TX 75083-3851 USA
Phone: 800 CXSOFT1 (800-279-6391)
Fax: 800 CXSOFTFAX (800-279-6393)
e-mail: info@cxsoft.convex.com
WWW: http://www.convex.com/prod_serv/cxsoft/

Price
Developer's License: $2800
Additional Developer's License: $1680
Unlimited Runtime License: $2800 per platform type
FINESSE Developer Software Support Agreement (1 year): $896
Evaluation Licenses are available at no charge.

Documentation
Manual: *Finesse User's Guide,* 116 pages

`-w` flag. *FsSeparator* simply creates a horizontal line. *FsOptionMenu* creates an option menu with two choices in this case: 1.0 or 2.0. The `-items` flag defines the possible menu choices. The `-var` flag defines **version** to be the shell variable in which to store the user's selection and assigns a default value of 2.0 to **version**. After the user makes a selection and presses the "OK" button, the Finesse application server terminates. The script then checks the value of **version**, and executes the appropriate version of *CoolApp*.

OSF/Motif Standard

Finesse applications are standard OSF/Motif applications that accept standard X command line arguments (e.g., `-display displayname:0`). Finesse applications can utilize the standard X Window methods of setting application resources: command line options, resource files (both system-wide and user-specific), and built-in defaults defined by the application. In addition, Finesse provides a "master" resource file that contains default resources used by all Finesse applications if no application-specific resource file is available. This provides a common look and feel for all of your Finesse applications. The Finesse *User's Guide* includes a handy table that shows the window hierarchy of all Finesse widgets and their corresponding class and instance names; this is extremely helpful for determining resource specifications.

Runtime State of Applications

Finesse provides a mechanism for saving the runtime state of an application on a per user basis. Finesse can save the values of widgets such as buttons, radio/check boxes, and text fields for a user. The next time the user runs the same application, the previous selections and entries will remain intact. The application developer can implement this feature in a variety of ways. The application can save the application state automatically each time the user exits the application. Or, the application interface can include a button (with a label such as "Save Settings") that allows the user to save the application state only when he chooses to do so.

Multiplatform Support

Finesse runs on a variety of UNIX platforms:

- HP-UX on HP PA-RISC
- AIX on IBM RS/6000
- ConvexOS on CONVEX C-Series
- SPP-UX on Convex Exemplar
- Solaris or SunOS on Sun Sparc
- DEC OSF/1 Alpha
- IRIX on SGI MIPS

Finesse scripts developed on any of these platforms are as portable as the shell scripts themselves. In other words, the addition of Finesse commands to a shell script does not make it less portable. A Finesse application developed using a standard shell known to be available on the destination system(s) will port without modification.

Installation

Installing Finesse is as simple as issuing a single *tar* command. The complete distribution installs into a single directory (configurable) and occupies just over 500 KB of disk space, which includes about 100 KB of sample shell scripts. Installation media is DAT or CD-ROM. The Finesse distribution is also available on CXSOFT's home page on the World Wide Web. If the installation directory is not */usr/local/finesse* (*/opt/finesse* on an HP-UX 10.x system), an environmental variable must be set to define the location of the Finesse distribution. Each workstation that executes Finesse applications requires direct access to the Finesse installation directory. This means that Finesse must be installed locally on the client workstation or a remote Finesse installation directory must be mounted.

Licensing

Finesse separates licensing for development and execution. The development license is node-locked, allowing unrestricted use of Finesse on a particular workstation. The runtime license allows the generation of runtime license keys. A runtime license key is a text string embedded in each Finesse script. A "non-development" workstation may execute a Finesse script that contains a valid embedded runtime key. Because the license key is based on the checksum value of a script, *any* modification to a Finesse script requires the generation of a new license key for that script. CXSOFT licenses Finesse on a per platform basis, requiring the purchase of at least one license per platform type.

CXSOFT offers a fully functional 30-day development license for those who wish to evaluate Finesse. This is an excellent way to determine if Finesse meets your needs without having to spend money up front.

Continued on Page 40

HP WORLD '96 Swap Tapes

For the seventeenth consecutive year, Interex conference Swap Tapes will be available for HP WORLD '96 attendees. The Swap Tapes are made up of program contributions from conference attendees who have developed hands-on solutions to real world problems. HP shops from around the world contribute to the tapes and apply to all HP platforms from HP-UX and RTE to MPEV and MPEiX.

Past Swap Tape MPE contributions include QUAD, Whitman Mail, GOD, MPED, CMSG, and IBM-PRINT. For HP-UX users past Swap Tapes have included PC_GZIP, SYSINFO, MOSAIC-2.6, and SNMPPAGE. The RTE community has contributed programs such as KERMIT, DO, SKETCH, and SPELR.

Contributors to this year's Swap Tapes will receive a tape free of charge. However, Interex Contributing Level Members with an Online Package, who did not contribute, can still purchase a Swap Tape at the Interex Booth (#211) on the HP WORLD Expo Floor for $95.

Additionally, all of the programs included in the HP WORLD '96 Swap Tapes will be combined with other contributions received throughout the year, sorted, run through a quality control process, documented, and released in the 1997 Interex Contributed Software Library. This service along with Interex's many other HP user resources help keep you a step ahead of your day-to-day computing challenges.

Questions? E-mail us at csl@interex.org.

interex

Shared Knowledge.
Shared Power.

Support

Finesse customers may purchase an annual support contract. The contract covers phone and e-mail access to technical support representatives. In addition, the contract covers all software updates during the contract period. The response I received to both phone and e-mail inquiries was excellent. Response time is quick, and the support representatives are knowledgeable and helpful.

Documentation

The user's manual for Finesse is concise and well organized. The information in the manual is complete, yet is only 115 pages, which I think is a good indicator of how simple Finesse is to use. The manual includes a section that guides the beginning user through the process of writing Finesse applications and setting X resources, complete with examples that include screen snapshots and script listings. A reference section describes the syntax of each Finesse command.

In my experience, the best way to learn any new concept is by example. Fortunately, the Finesse distribution includes 20 sample applications that illustrate the use of all the Finesse commands.

Limitations

Limited Widget Set

The "Finesse widgets" are a subset of the core Motif widget set. There is currently no way to incorporate other Motif widgets into Finesse applications. Similarly, there is no provision for integrating commercial widgets or locally developed widgets. Finesse supports the following Motif widgets: TopLevelShell, Form, Label, List, PushButton, Separator, Text, FileSelectionDialog, OptionMenu, RadioButton, CheckButton. The "missing" widgets of note are ArrowButton, Scale, Frame, PanedWindow, and most of the convenience dialogs.

Argument Length

Because applications built using Finesse are shell scripts, the restrictions that apply to the shell also apply to Finesse applications. For example, the HP-UX POSIX shell limit for the number of characters in a shell command argument (ARG_MAX) is 20,478. Finesse uses shell arguments to pass information to Finesse commands. These arguments can be quite long. To illustrate, a call to *Fsdisplay* includes a parameter containing the window definition of the window to be displayed. This definition usually includes variables containing the values of various Finesse widgets. If one of these widgets is a List widget, the value of the variable that holds the contents of the list can be thousands of characters. While ARG_MAX seems incredibly large, I wrote a Finesse script that hit the limit! The script loaded the results of the command

```
find / -type f -size +5253880c -exec ll {}
```

into a variable used to fill the contents of a scrolled list. If the *find* command returned more than ~250 files, the script exited abnormally with an "arg list too long" message. In order to make this script run, I modified it to load only the largest 200 files returned by the *find* command into the List widget variable. While this was a completely acceptable solution for this particular script, there may be instances where this limitation could be a problem.

Inability to Change Widget Resources Dynamically

Once an application initiates the Finesse application server (via the *Fsopen* command), there is no way to change many of the visual and behavioral resources of widgets (such as color and sensitivity). For some applications, this can be a major limitation. For example, consider an application that contains several widgets. The sensitivity of some widgets should change (become "grayed out") based on the user's input in another widget. Finesse provides no way to do this. However, Finesse does allow the modification of the values of widgets, such as the contents of a scrolled list or the text string of a label.

Distribution of Finesse Applications

Because of Finesse's licensing scheme (discussed above), distributing Finesse applications is somewhat restrictive. You cannot "give away" scripts that you develop with Finesse unless all licensing restrictions are satisfied. The "per platform type" licensing policy could make it an expensive option if you wish to develop scripts for multiple platforms.

Comparison to Other Graphical Application Builders

How does Finesse stack up against similar solutions for creating graphical applications in the UNIX environment? I found two products that are similar to Finesse in their implementation and target audience: Tcl/Tk and the Desktop KornShell (dtksh).

Continued on Page 42

Tcl (Tool command language) and the Tk toolkit are two public domain software packages that can be used together for developing graphical applications. Tcl is a scripting language and Tk is an X Window toolkit built on top of (and with) Tcl. Dtksh is a component of CDE, included with the CDE distribution in the */usr/dt/bin* directory. It is an extended version of the Korn shell, containing new built-in commands for building OSF/Motif applications.

The Programming Environment

Graphical applications built using Finesse, Tcl/Tk, and dtksh are interpreted scripts. The scripting language for Tcl/Tk applications is unique, while both Finesse and dtksh use standard UNIX shell scripting languages. One difference between the Finesse implementation and the dtksh implementation is that dtksh scripts "look" very similar to Xlib/Xt/Motif C programs. They follow the same basic structure, including callback routines and an event processing loop. Finesse scripts "look" more like regular shell scripts. Finesse does not explicitly support callbacks and requires the developer to create an event loop using a structure such as a "while" loop. Creation of widgets in Finesse is generally easier than in dtksh because Finesse shields the developer from many of the details of creating complex widgets. A good basic knowledge of X programming is a prerequisite for building applications using dtksh, while Finesse development requires no X programming experience.

Supported Widgets

All three packages provide access to a set of widgets for building graphical interfaces. Tcl/Tk includes a rich set of predefined widgets and allows developers to define their own widgets. Huge collections of Tcl/Tk widgets developed by other Tcl/Tk users are freely available on the Internet. Tcl/Tk widgets are *not* based on the Motif toolkit, the de facto standard widget set. Widgets created by dtksh and Finesse *are* based on the Motif toolkit. Finesse supports a subset of the Motif widgets, while dtksh supports virtually all of the Motif widgets and convenience functions. In addition, dtksh provides interfaces and functions to access components of the CDE environment such as the CDE Help system, the CDE Workspace manager, or the CDE session manager.

Distribution of Applications

There are at least three issues to consider when distributing applications: portability, licensing, and platform availability. Applications built using any of the three packages are easily ported to other supported systems and platforms. This is mainly because the applications are scripts rather than binary files. Tcl/Tk applications are the easiest to distribute in terms of licensing, because both packages are public domain freeware. Dtksh applications may be distributed freely to systems that have CDE. Finesse applications are subject to the licensing restrictions discussed earlier. In terms of platform availability, Tcl/Tk is the most widely available. It is supported on virtually all UNIX systems, as well as Windows and Macintosh. CDE, which includes dtksh, is a standard being adopted by all the major UNIX suppliers. IBM, Sun, HP, and Digital have either shipped CDE or will ship CDE as their standard desktop this year. Because of CDE's momentum, dtksh has the potential of being ubiquitous in the near future. Finesse is available on the major UNIX platforms (listed earlier).

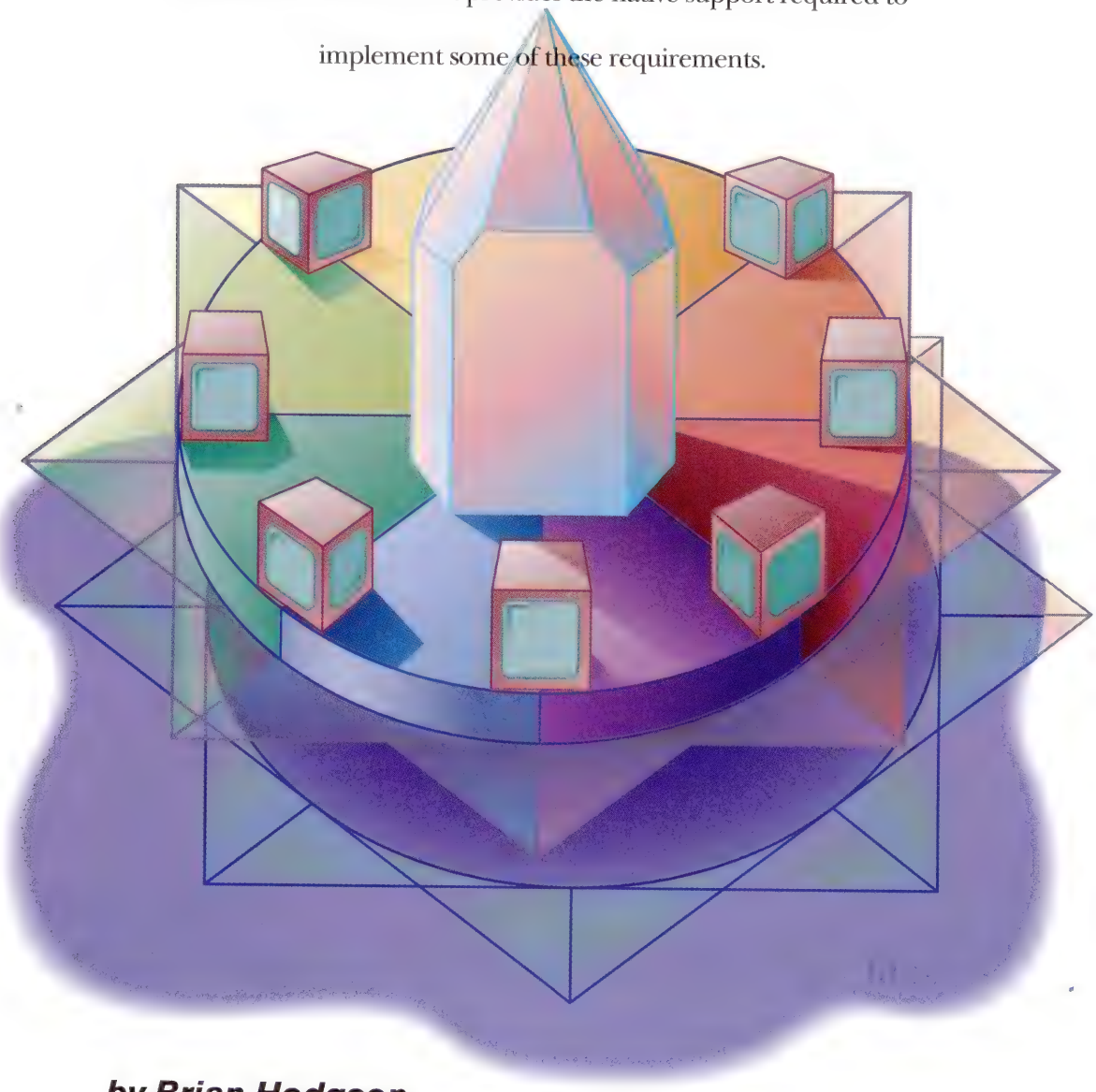
Summary

Finesse is a tool to help non-programmers create graphical applications. It is simple to learn and requires no graphical programming knowledge. The major trade-off for simple, straightforward solutions to any problem is usually a lack of flexibility. Such is the case with Finesse. Programmers wishing to create complex applications will find that Finesse has limitations that are difficult to overcome. However, Finesse is particularly well suited for system administrators wishing to create a more "user-friendly" environment. Because system administrators are already accustomed to writing shell scripts, creating graphical interfaces with Finesse is as easy as learning a small set of new commands. Finesse is also useful for transforming existing shell scripts into graphical applications. Existing scripts that are most easily adaptable to Finesse are those that gather a set of user inputs "up front" and then use those inputs for further processing. ◧

Kelley Fugelso has worked at Science and Engineering Associates, Inc. for the past seven and a half years. During that time she has served as the sole system administrator of a network of HP 9000 UNIX workstations as an on-site contractor to Sandia National Laboratories. She is currently the chairman of Albuquerque's local chapter of InterWorks (Rio Grande InterWorks) and has been in this position for almost three years.

Legacy Application Access

This article illustrates how features of HP-UX can be used to build a flexible and modular client-server application. It specifically shows how DNS, TCP/IP, and HP-UX streams can be used to build a network application. This is achieved by highlighting the key requirements for an effective enterprise SNA server and discussing how the HP-UX environment provides the native support required to implement some of these requirements.



by Brian Hodgson

Illustration by Stephan Kramer

Enterprise Server Requirements

The most critical element of TCP/IP-SNA integration is the enterprise SNA server. That's because thousands of corporate internetwork users now want access to host data—and the enterprise SNA server is the only way to give it to them effectively. Connecting every user through a central server delivers access, simplifies management, leverages existing investments, and leaves room for growth.

Virtual Server

High availability to the host data is the most critical requirement for the enterprise SNA server. A virtual server system, where multiple servers act as one, has redundancy and hot standby built in. If one server goes down, another immediately backs it up. Furthermore, a virtual server architecture provides other advantages, such as load control, fault resiliency, and scalability.

Load control distributes the communications processing among several systems based on the gateway systems' current load. The server selects the system with the most processing availability and widest available bandwidth to the host.

By distributing the server across multiple systems, the SNA server can be scaled easily to meet needs as enterprise requirements grow.

Management Interface

Large-scale servers need an integrated management system. This allows the setup and monitoring of thousands of users from a simple, point-and-click interface. Having a Graphical User Interface (GUI) makes adding new systems much easier and allows the tracking of resource states and response times to be done from a single point. Since the objective of the SNA server is to integrate TCP/IP and SNA, mainframe operators should be able to monitor the server using NetView, and a standard SNMP management interface should be provided as well.

Comprehensive Legacy Device Support

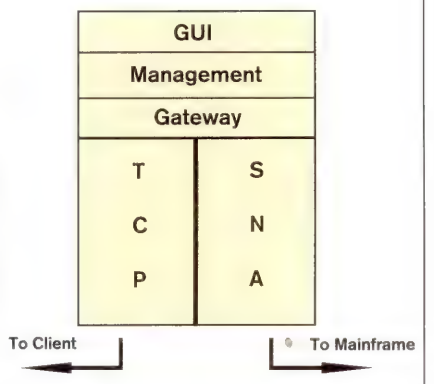
A complete set of legacy device support is important for a comprehensive integration of TCP/IP and SNA. This includes support for LU0, 3270, 3287, LU6.2, and RJE/3770. Support of these clients should be done via industry-standard protocols such as TN3270E (rfc 1647).

Implementation in HP-UX

The basic components of the enterprise SNA server are shown in *Figure 1*: GUI, management, and gateway functions. The GUI provides a user-friendly view into the management of the server. The management component controls the configuration, monitoring, and diagnostic functions, as well as supporting any network management protocols. Finally, the gateway function is the engine that performs the actual translation between the TCP and SNA network protocols.

In the HP-UX environment the GUI, management, and gateway functions should be implemented as separate processes (GUI, MP, GP, respectively) that communicate with each other using standard TCP/IP sockets. This provides the ability to run these processes on the same machine for a small configuration or across multiple machines for larger configurations. Larger configurations are achieved by replicating the gateway process (GP) and its supporting services across multiple machines, and having the management process (MP) track the SNA resources. This is shown in *Figure 2*.

FIGURE 1 *Components of the Enterprise SNA Server*



The GPs are responsible for the local system connectivity between TCP and SNA. With TCP/IP native to HP-UX, the TCP stack becomes a trivial matter. This allows connectivity to the TCP network through any adapter supported by the HP-UX host. Similarly, implementing the SNA stack in a streams environment permits the easy support of lower layer protocols, such as Token Ring, SDLC, and Ethernet, simply by accessing these drivers through the DLPI interface.

The GPs also monitor SNA resource states, respond to mainframe requests, and send any status changes to the MP. By using SNMP to communicate with the MP, the GPs provide support for more general management applications such as HP OpenView.

In the design in *Figure 2* the management function uses SNMP to monitor and manage all of the GPs configured in the enterprise server. The management

FIGURE 2 *Larger Configurations*

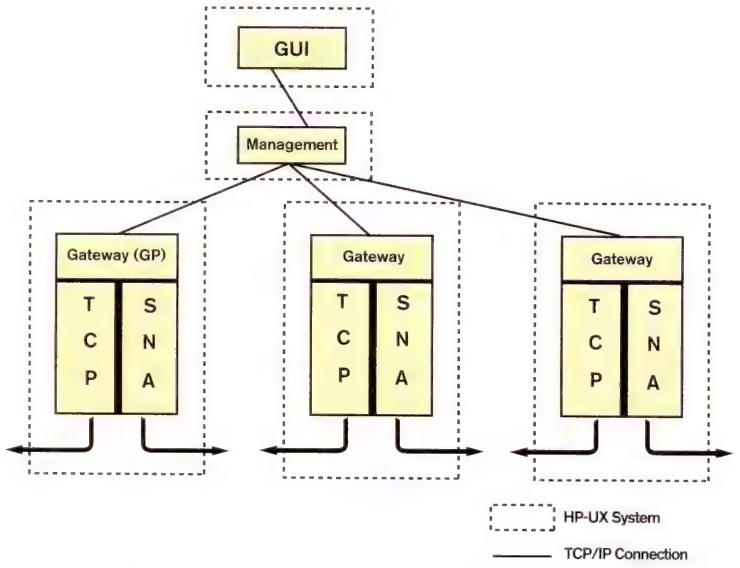
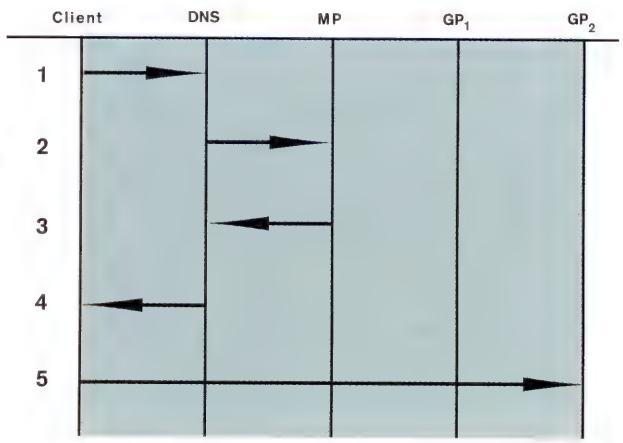


FIGURE 3 *Load Balancing Using DNS*



process is the focal point for the virtual server and provides services to the GUI that allow the virtual server to appear as a single application.

Load Balancing Using DNS

The ability to run multiple GPs on various HP machines implies the need for a sophisticated load balancing algorithm to ensure that one system does not get all the traffic-intensive sessions. This is achieved by integrating the load balancing scheme with DNS. Since the management process has the SNA resource state information, it is the best place to control access to the GP systems based on system load, number of sessions, and the type of connectivity available to the host. This is done by integrating the MP into DNS and pooling SNA resources across multiple GP systems. The management process directs incoming TCP/IP client connections to the appropriate GP system by acting as a DNS server with the SNA resources represented as a zone within DNS naming.

For example, company XYZ would define a DNS zone called *sna*. A client requesting an LU from a pool (named *pool*) would format its DNS host request as *pool.sna.XYZ.com*. This DNS request, serviced by the primary DNS server and based on the DNS configuration and the requested *sna* zone, finds its way to the MP. This is shown in *Figure 3*. The details of the steps follow:

1. The SNA client emulator issues a request to translate an SNA resource name into an IP address using the system call *gethostbyname*. This is translated into a request to DNS.
2. The DNS server(s) recognize the resource name as part of the zone handled by the MP, which is seen as simply a downstream DNS server. The request is forwarded to the MP.
3. The MP decodes the resource name and determines that it is a request for a resource from an LU pool that spans two systems controlled by GP1 and GP2. Using the information it has collected with regard to system load, connectivity to the host, and number of connections, MP selects GP2 as the best system to handle a new client connection. The IP address of this system is put in the DNS response and fed back through the DNS servers. The DNS response can contain multiple addresses ordered in descending order of preference.
4. Intermediate DNS servers can reorder the list of addresses, based on zone, so that a local GP system will be preferred over a less loaded system located far away.

5. The client receives the IP addresses of the best GP system and issues a TCP connection in order to establish a session with the host.

SNA Stack

The GP controls the SNA stack on the HP system. This is the key element for accessing the SNA hosts, and its implementation must be done in a flexible manner that is independent of the client protocol (TCP/IP, IPX, etc). The IBM SNA protocol stack is organized like this:

Presentation Services
Data Flow Control
Transmission Control
Path Control
Link Control

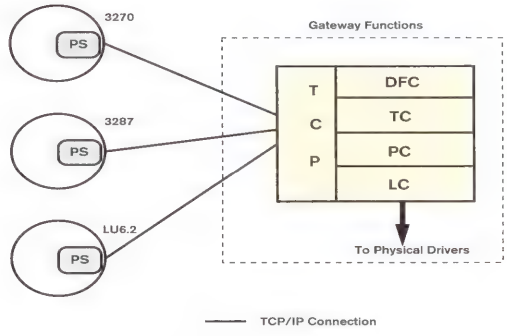
Presentation Services: This layer is unique for all SNA devices (or LU types).

Data Flow Control, Transmission Control, Path Control: DFC, TC and PC are Common Services that handle request/response correlation, protocol adherence, flow control, and sequencing.

Link Control: reliable point-to-point connection-oriented services (e.g., SDLC, LLC2, QLLC).

One objective of the SNA stack within a gateway is to support various clients (3270, RJE/3770, LU6.2, etc.) at the top of the stack, while being supported by a wide selection of connectivity options at the bottom of the stack. These two objectives are achieved in different ways. The need to support a variety of client types is accomplished by splitting the stack at the presentation services layer.

FIGURE 4 *SNA Stack Splitting*



Alternatively, the best way to guarantee the maximum underlying connectivity choices is to implement the lower layers of the stack in HP-UX streams and interface to the available physical drivers.

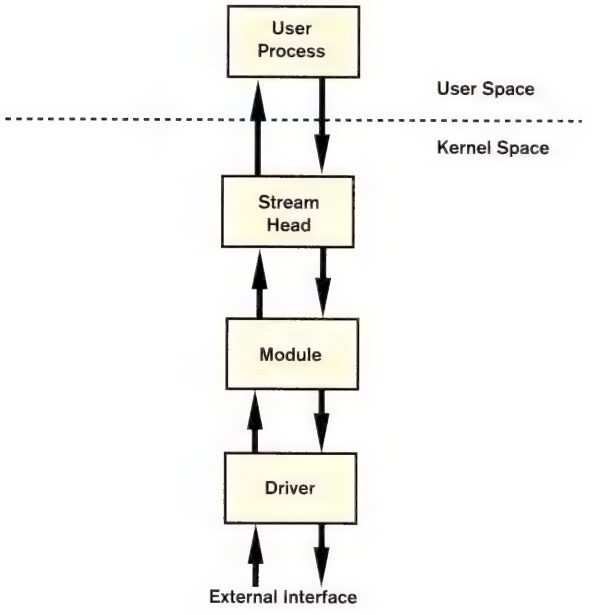
SNA Stack Splitting

The core functions of GP are the common functions of the SNA stack: DFC, PC, TC. By splitting the stack at presentation services and moving this to the client, one leverages the common functions while providing support for any client type. This is shown for a variety of clients in *Figure 4.*

Moving the presentation services out to the client via an API allows the clients to be distributed anywhere in the IP network.

Continued on Page 48

FIGURE 5 *Protocol Stack*



Furthermore, the client need not be a single client emulator but could itself be a front-end server to handle subsequent downstream clients. This is useful for support of standard protocols, such as TN3270, or de facto standards, such as SAA over IPX/SPX.

HP-UX Streams

Implementing the SNA stack (or any protocol for that matter) within the streams environment makes possible an implementation in modules that relate closely to the model of the stack as defined above (link control, path control, etc.). Furthermore, since the streams are implemented in the kernel, this provides a much better performing implementation than anything implemented in user space.

A protocol stack implemented in the HP-UX streams environment is made up of a stream head, one or more streams modules, and a driver. This is shown in *Figure 5*.

In the SNA server implementation, the user process in *Figure 5* represents the gateway function. In the mainframe-bound case the SNA gateway receives data off the native TCP/IP stack, extracts the relevant SNA data (application data plus whatever header information is required), performs any appropriate translation, and transmits the data down the SNA stack using the streams interface.

The modules within the stream represent the various SNA layers, with each module performing functions outlined for its layer. At the bottom of the stack the link control protocol (SDLC, LLC2, etc.) interfaces with the physical device driver.

The physical driver provides the interface between link control and the hardware used to transmit/receive the data (Token Ring, Ethernet, etc.) As a result the physical driver must be specific for each connectivity type. However, given the requirement for consistent upstream support, a standard interface to the physical layer drivers is defined and supported within the HP-UX streams environment. This is called DLPI (Data Link Program Interface).

Since DLPI provides a standard interface to the various physical interfaces, implementing the lower layers of the SNA stack in the HP-UX streams environment makes it easy to support new physical interfaces.

One can also bring in standard protocols further up the stack. SNA over X.25 is a common application, and since many third-party X.25 stacks provide a standard interface in NLI (Network Layer Interface) in the HP-UX streams environment, providing SNA access over X.25 simply means that the gateway attaches closer to the top of the stack.

Summary

As can be seen from the enterprise SNA server implementation described above, HP-UX provides some key functionality that can be applied in any client-server communications application. The use of TCP/IP, distributed processes, and DNS allows the applications to be network applications. The HP-UX streams environment allows for a very modular communications stack implementation, permitting multiple applications to use the stack and insulating the protocol stack from various hardware adapters. ◧

Brian Hodgson is the Brixton product manager at Computer Network Technology Corporation (CNT). In this role, he is responsible for product definition and marketing of the Brixton PU2.1 and PU5 SNA Servers, CNT's flagship SNA-to-TCP/IP connectivity software.

Book Review

by Michael Ehrhardt

Portable Shell Programming: An Extensive Collection of Bourne Shell Examples

BRUCE BLINN'S *Portable Shell Programming: An Extensive Collection of Bourne Shell Examples* is a welcome addition to the growing collection of titles in the Hewlett-Packard Professional Books series published by Prentice Hall.

Looking at working examples is one of the best ways to learn Shell programming, and Blinn provides a wide variety of example scripts and functions that can be used as is, modified, or added to longer scripts. The book is not intended to teach you how to use UNIX; rather, it is intended "for people who are already familiar with UNIX and, for one reason or another, have decided to write a shell script." It is also meant to be a useful reference. The examples are organized and indexed so that you can refer to them quickly. Early chapters offer a full treatment of the Bourne shell syntax. There is also a handy summary of syntax in an appendix.

Blinn has chosen the Bourne shell because it is universally available on UNIX systems (*Portable* is the first word of the title). With HP-UX 10.x comes the CDE interface and the POSIX shell, but since both the Korn and the POSIX shell "contain all of the syntactic constructs of the Bourne shell," the examples are compatible. Where important differences come up, Blinn has a remark or footnote to draw the reader's attention to the distinction. For example, in the section on reading files he starts with a simple loop to read line by line:

```
while read LINE
do
   . . .
done <file
```

He points out that using file redirection causes the loop to be executed in a subshell, but in a footnote he notes that the Korn and POSIX shells do *not* create a subshell when the input or output of a shell statement is redirected.

In those cases in which the examples have dependencies on a particular flavor of UNIX or on a vendor's implementation of a command, the author explains the dependencies and provides a portable solution. In the chapter on portability, for instance, he discusses the differences between the BSD and System V versions of the *echo* command. The examples are working scripts and functions that are designed to be "easy to understand, but not necessarily the most efficient solution, or in some other way, the most desirable solution." It is up to the reader to decide when and how to alter an example for a particular situation.

The functions and complete scripts discussed in the text are also on the diskette provided with the book. They are available as well from the Prentice Hall ftp server; the author even provides a sample dialogue to demonstrate how to acquire the examples electronically with ftp.

Title	**Portable shell Programming: An Extensive Collection of Bourne Shell examples**
Author	**Bruce Blinn**
Publisher	**Prentice Hall PTR, 1996, 288 pages plus diskette** **ISBN: 0-13-451494-7**
Price	**$29.95** **Quantity discounts available**
Information:	**http://www.prenhall.com**

Topics

The book's 13 chapters and two appendices cover the following topics:

- Chapter 1, "Shell Syntax"
- Chapter 2, "Shell Variables"
- Chapter 3, "Shell functions and Built-in Commands"
- Chapter 4, "Using Files"
- Chapter 5, "The Environment"
- Chapter 6, "Parsing command Line Parameters"
- Chapter 7, "Using filters"
- Chapter 8, "Shell Utilities"
- Chapter 9, "Examples of Shell Functions"
- Chapter 10, "Examples of Shell Scripts"
- Chapter 11, "Debugging"
- Chapter 12, "Portability"
- Chapter 13, "Common Questions and Problems"
- Appendix A, "Comparison of UNIX Shells"
- Appendix B, "Syntax Summary"

The first four chapters make up a thorough treatment of the Bourne shell syntax. Explanation is always accompanied by examples, not only of the right way to do something but also of the wrong way, so as to underscore common mistakes. Syntactic points that at first can be confusing are covered in detail. Several pages, for example, are devoted to quoting and command substitution so that the reader gains a full understanding of the uses of the single and double quotes, the backslash, and the back quote. Here, as throughout the book, even short examples such as

```
who | awk '/^'"$USER"'/ {print $2}'
```

are often useful. This example prints the names of the terminals you are logged into using single and double quoting to pass the value of the variable *USER* to an *awk* script.

In the chapter on shell functions and built-in commands the author lays out clearly the different ways functions can behave depending on whether they are executing in a subshell or in the current shell. Most of the chapter is devoted to the built-in commands, with references to other parts of the book that expand upon the uses of the commands. Chapter 4, "Using Files," covers the basics of file manipulation. Descriptors, redirection syntax, redirecting input and output, opening, writing, reading, closing, truncating, here documents–all are discussed with examples.

The chapter on filters starts out with a section on using *sed*. The balance of the chapter is devoted to creating filters for text files using *sed*. Most of the processing one commonly does on files is discussed, including replacing and removing text, inserting and appending text, deleting white space, downshifting, deleting empty lines, and so on.

Chapter 8 covers a number of essential utilities: arithmetic operations involving *expr, bc, dc,* and *test,* string manipulation, parsing data, interacting with the user, process manipulation, processing mail, and so on. These are short examples. In many instances the action being discussed is given a more general and complete treatment in the chapters on functions and scripts.

Chapters 9 and 10 present the example functions and complete scripts. Each example is presented in full with line numbers for easy reference. Following each listing, the author provides more or less line-by-line analysis, with comments on special issues and portability concerns. Some of the scripts are expansions and more flexible versions of UNIX commands, e.g., *Kill, MkDir,* and *Wc.* All the listings in these chapters are on the included diskette and available also via ftp.

The chapter on portability contains a useful section on issues with specific commands. Here the author discusses both the differences between System V and BSD versions and different vendor implementations of commands such as *cp, df, echo,ps, ls, remsh,test, pwd, getopts, du,* and *tr.*

Chapter 13 is in the form of a Q&A for the beginning script programmer. The author deals with common problems as well as how-to matters. Problems include such things as, Why do the command line parameters disappear? Why does my shell script print a list of variables? and Why does a for loop read a file one word at a time? How-to questions cover a number of actions users will find useful (where fuller discussions exist, the reader is referred to the appropriate chapter). For instance, the author provides the following solution to the question, How can I rename all of the files named *xxx** to *yyy**?

```
OLD=xxx
NEW=yyy
for f in $OLD*
do
   SUFFIX=`expr $f : '$OLD\(.*\)'
   mv $OLD$SUFFIX $NEW$SUFFIX
done
```

This uses *expr* to extract a substring, a topic he covers in Chapter 8. However, the proofreaders must have checked this example at the end of a long day: the back quote is unmatched with a closing back quote and the single quotes should be double quotes so that *$OLD* will be treated as a variable. Or perhaps the author is just testing to see that the reader has absorbed the material. At any rate, rendered as:

```
OLD=xxx
NEW=yyy
for f in $OLD*
do
   SUFFIX=`expr $f : "$OLD\(.*\)"`
   mv $OLD$SUFFIX $NEW$SUFFIX
done
```

it works as advertised.

I did notice a few other minor typos, but on the whole the text appears quite clean. The book is well organized and properly indexed and cross referenced so that you can easily look up a topic or check a point of syntax. Blinn has provided a handy reference for both the beginning shell programmer and the experienced administrator. ◧

Michael Ehrhardt is managing editor of hp-ux/usr.

It's here!

From the creators of the leading HP3000 backup product and the inventors of online backup capability comes

BACKUP/9000

BACKUP/9000 offers significant benefits over SAM, fbackup, tar, and all HP9000 backup packages:

- ✔ Much faster backup and restore
- ✔ "Set and forget" scheduling
- ✔ Data compression and encryption
- ✔ Unattended "lights out" backup
- ✔ Append a week's backups to one tape
- ✔ Tape library management
- ✔ Backup to multiple tape drives
- ✔ Full network support
- ✔ GUI and command-line interface
- ✔ Much more

With over 3,500 HP customers, ORBiT has been writing HP backup software for over 10 years. We welcome the challenge to prove our product in your own environment: contact your local ORBiT representative for a free demo copy.

ORBiT USA	ORBiT Benelux	ORBiT France	ORBiT Germany	ORBiT UK
+1 (510) 837-4143	+31 (3465) 53 884	+33 (40) 68 85 50	+49 (30) 852 70 97	+44 (1306) 741741
fax (510) 837-5752	fax (3465) 54 101	fax (40) 68 85 52	fax (30) 852 70 35	fax (1306) 742742

ORBiT Scandinavia	ORBiT Spain	ORBiT Italy	ORBiT Far East
+358 (0) 638 450	+34 (1) 304-4530	+39 (2) 33 41 21	+65 227-6959
fax (0) 638-445	fax(1) 327-2943	fax (2) 33 41 23 33	fax +65 227-6867

ORBiT GROUP INTERNATIONAL

CIRCLE 122 ON READER SERVICE CARD

X-Watch

by Larry Headlund

Even More Help

I TALK A LOT ABOUT help systems. I've come a long way since the time I considered help systems an earmark of bad design. Shouldn't it be obvious how to use the application? Isn't help documentation just admitting defeat? I've gotten over that attitude now, and would like to have a serious talk with the persons who put that idea in my brain. For anything beyond "push me to display message," help documentation is essential. It is even important if no one but the author reads it. For smaller projects, writing the help documentation *first* is itself an excellent design tool. For larger projects, you do the object-oriented design or data flow, or use CASE, and then do the documentation. The only exception is when the coders or designers are unfamiliar with the tools they are using and need to get a feel for the possibilities and impossibilities before they can make intelligent decisions. Even then, the documentation is forethought, not afterthought.

GUI tools and interfaces have been a big help in documentation production, not least in raising the bar of user expectations. Even more of an aid than the help standards, such as F1 for Help, were the tools to provide that help. Popup windows for help were a godsend. But with that rose came a thorn: inconsistency.

In the beginning was the Fine Manual and the *nroff* tools for formatting manuals. And this was really the beginning–the first use of the UNIX System at Bell Labs was to produce technical documents. The man pages developed conventions and standards. But how does this fit in the new world of online documentation? You could use entirely different documents for your online documentation and your printed documentation, but to my mind this is very much of a bad thing. Two distinct documents beg to diverge. Tools such as FrameMaker can provide a platform for printed and online documentation from the same document. But FrameMaker requires a license on any platform that uses this capability. This causes serious problems for freely distributed software. Also, there is a strong body of opinion, represented by Tom Christiansen, maintainer of Perl, that every program should have a man page. This provokes a spirited response from the Free Software Foundation partisans, since the FSF supports its own format, texinfo, which is used with its own tools and to which the FSF is partial. This recently started a spirited debate on *gnu.misc.discuss,* and mightily did the two sides smite each other. I lean toward the man side of the debate and in 1991 B.Raoult (*mab@ecmwf.co.uk*) produced a program with a special widget for displaying man documents in a Motif environment. I have discussed this program before. Briefly, it makes your existing collection of man pages into a hypertext library which can be searched hypertext style with mouse clicks. You can find this program at *iworks.InterWorks.org* in */pub/comp.hp/hman.tar.gz*.

In a recent project I needed a simpler tool than hman. I discovered a mechanism for providing online help messages, and I read about using World Wide Web tools for help documentation.

A Simpler Tool

One of the problems you face in choosing a medium for displaying help documentation is availability. The classic man command is available on every UNIX system. With other methods you either assume it is available on the target

system or include the help system with your application. I was working on a small package intended for public release on the Internet. I could not make any assumptions about the user's environment. When you are targeting an installed base of clients, you know what they have. When you are providing a program for anybody to pick up and use, your package had better be self-contained. Other people have other takes on this issue. The GNU/ Free Software Foundation packages often assume you are in a GNU environment. Many of their packages assume that you have *Emacs*, *gcc*, *info* for documentation, and sometimes *bison*, the GNU *yacc*.

This can make it difficult to cherry-pick a particular package. Of course, GNU partisans will retort that you should have all these GNU things and that the assumption makes their distribution lighter and more efficient.

In my case, I wanted to use a single man format document as the source and wanted a lightweight package. The application was simple and wouldn't use any links where hypertext would be neat. The hman package would be almost twice as big as the application it was supporting.

What I wanted was to create a scrolled text widget that would have the contents of a man page inside it. Stated that way the problem almost solves itself (*Listing 1*). The only moderately tricky part was eliminating the typesetting characters in the normal output of the man command. That is the purpose of the *col -b* filter in the command string. All that remained was to attach the callback manCB to the "Help" button, which will be left as an exercise for the reader.

F1 Help

More than a monolithic help document is needed. If nothing else, something should happen when the user presses F1 in a widget. Usually this is a simple line of explanation. My usual GUI construction aid is WCL and I accomplish this with lines like the following in my *appdefaults* file:

```
*mywidget.helpCallback:\
   WcSetValue(\
      *dialogHelp.messageString: Your message here),\
   WcManage(*dialogHelp)
```

In the project I was working on, this wouldn't do. I was modifying an existing application written in straight C. So I needed some way of specifying the contents of the help message without creating an individual help widget for every widget. What this forced on me was a somewhat elegant solution.

First I created a generic help callback function (*Listing 2*) This callback, *displayHelp*, will be the helpCallback for almost every widget. The *help_dialog* widget itself is created during main widget creation with a line like:

```
help_dialog = XmCreateInformationDialog( toplevel,
                                         "helpdialog",
                                         (ArgList)0,
                                         0);
```

Note that in the code the contents of the *help_widget*, the *.messageString*, is read for each widget at the time of the call. This overhead seemed to me to be unimportant compared to the advantage of having a single resource for each widget to define help. For each widget I have a resource named *.helpMessage*. In the resource file I will specify the message with lines such as:

```
*Exit.helpMessage: Exit without saving settings
```

or

```
*Device.helpMessage: Specify a local device
```

I liked this technique so well I did the same thing for warning messages. And now for something completely different.

You recall that at the beginning of this column I said that for the help system we wanted a universally available tool, a single document for printing and online access, and compatibility with the man format. As Meatloaf said, two out of three ain't bad. The (near) universal access tool is the Web browser, represented by the original NCSA Mosaic, its progeny Netscape, or any of the competitors. The single document becomes an HTML (HyperText Markup Language) document, which can be printed and displayed. You don't get a man page document, but there is a way around this. The workaround is the "pod" format, for which there exist tools to translate into HTML and man format, among others. You could just write your manual in HTML and have a note that says "Point your browser here." I have something more sophisticated in mind.

In issue sixteen of *The X Resource* (O'Reilly & Associates), Keith Geimeinhart (*keithg@tsc.com*) outlines an API for, as he

LISTING 1 *Displaying Man Pages*

```
#include   <Xm/Xm.h>
#include   <Xm/Text.h>
#include   <unistd.h>
#include   <stdlib.h>
#include   <stdio.h>
#include   <string.h>
#include   <sys/stat.h>
#include   <sys/types.h>

#ifdef _NO_PROTO
static void manCB(w, parent, unused)   /* display man page */
Widget   w;
caddr_t   parent;
caddr_t   unused;
#else
static void manCB(
Widget   w,
caddr_t   parent,
caddr_t   unused)
#endif
{
    static Widget    help = (Widget)0;

    watchOn(w);
    if (help == (Widget)0 &&
            (help =  XmCreateInformationDialog((Widget)parent,
                                "helpmessage",
                                (Arg*)0, 0))
            ) {
        static Arg    arg[] = {
                        {XmNeditMode,    XmMULTI_LINE_EDIT},
                        {XmNeditable,    False},
                        {XmNcolumns,    80},
                        {XmNrows,    20},
                        };
        int            n = 4;
        Widget         scrolledText = XmCreateScrolledText(    help,
                                    "text",
                                    arg, n);
        char*          strName = tmpnam((char*)0);
        char           strCommand[128];
        int            i    = sprintf(    strCommand,
                        "man xmbarcode 2>/dev/null | col -b >%s",
                            strName);
        int            err    = system(strCommand);
        FILE*          f = fopen(strName, "r");
        struct stat    statbuf;

        if (f && stat(strName, &statbuf) == 0) {
            size_t    length = statbuf.st_size;
            char*    strContents = (char*)
                            XtMalloc(length);
            if (length > 0) {
                (void)fread(strContents, sizeof(char), length, f);
                (void)fclose(f);
                XmTextSetString(scrolledText, strContents);
                }
            else {
                XmTextSetString(scrolledText, "No manual");
                }
            (void)unlink(strName);
            XtManageChild(scrolledText);
            }
        }
    watchOff(w);
    if (help) {
        XtManageChild(help);
        }
    }
```

LISTING 2 *Displaying a Help Line*

```
#include   <Xm/Xm.h>
#include   <Xm/MessageB.h>

Widget   help_dialog = (Widget)0;

typedef struct  _MessageDialogResource {
   char*   s;
   } MD;


#ifdef _NO_PROTO
void displayHelp(w)
Widget   w;
#else
void displayHelp(
Widget   w)
#endif
{   /* read message from w.helpMessage and display */

    if (help_dialog && w) {
        static    XmString    xmstring = (XmString)0;
        static    MD wd = {(char*)0};
        static XtResource resource[] = {
        {"helpMessage",
            "HelpMessage",
                    XtRString,
                    sizeof(String),
                    XtOffsetOf(MD, s),
                    XtRString,
                    (XtPointer)"No Help Message"},
                    };

        if (xmstring) {
            XmStringFree(xmstring);
            }
        XtGetApplicationResources(  w,
                                    (XtPointer)&wd,
                                    resource,
                                    XtNumber(resource),
                                    NULL, 0);

        xmstring = XmStringCreateLocalized(wd.s);
        XtVaSetValues( help_dialog,
                       XmNmessageString, xmstring,
                       NULL);
        XtManageChild(help_dialog);
        }
    }
```

describes it, "An Elegant Online Help System for X/Motif Programs." The API implements a way for our friend the helpCallback to open a browser (if needed) for a specific URL, which is your help document. The API is very simple and straightforward to implement in your code. It supports launching either NCSA Mosaic or Netscape.

You can get your very own copy at *ftp.tsc.com:/pub/tools/XtscHelp.tar.gz.* ◧

Larry Headlund is president of Eikonal Systems, a software development company specializing in the optical industry and a consultant on UNIX and X. He has been working with commercial UNIX since 1982 and with HP-UX since 1984. He can be reached at lmh@world.std.com or 1.617.482.3345.

Internet Goodies

by Joseph Berry

IN THIS MONTH'S COLUMN, you will find some interesting documentation that is available for downloading. In addition, a number of interesting graphics packages are described.

MISC

xpaint 2.1.1

This is cute! As far as I know, it's the only real bitmap/pixmap editing tool available in UNIX at no cost. It offers the standard MS-DOS Windows brush operations such as brushes, spray paints, pencil drawings, circles, boxes, text, etc. It supports the following file formats: X11 bitmaps, PPM, GIF, PostScript (for writing only), XPM, and TIFF. If you have or want a graphic file in another format, then use *pbmplus* to convert to one of the xpaint-supported formats.

Xpaint was written by David Koblas (*koblas@netcom.com*) and can be found at *ftp.x.org* in */contrib/applications* (among many other places) as *xpaint-2.1.1.tar.gz*.

anonftpd 0.95

Daniel Bernstein has contributed anonftpd, a fast, read-only anonymous ftp server. A feature of this program is the installation procedure, which is simpler to follow than the standard anonymous ftp procedures. With a normal ftp server, you create a directory and copy into it files such as */etc/passwd*, shared libraries, and an 'ls' program. These files are not required with anonftpd. The program automatically goes to the new directory and sets up its own permissions. It appears to be very security conscious; it supports RFCs 959 and 1123 with two security-related exceptions that are documented.

The software is available from *koobera.math.uic.edu* as */pub/software/anonftpd-0.95.shar.gz*. To unpack this package, you must first run gunzip. This will create a file called *anonftpd-0.95.shar*. You then pass this file into a Bourne shell script as follows: `sh anonftpd-0.95.shar`. This is followed by a "make."

gnuplot 3.5

I recently needed to plot and display some data. I turned to gnuplot as an inexpensive, easy-to-use solution. While the software is distributed by the Free Software Foundation (makers of emacs, gcc, etc.), it has no relationship to them nor is it covered by their license. The official site for the software is *ftp.dartmouth.edu*. The file is called */pub/gnuplot/gnuplot3.5.tar.Z*.

gnuplot works on a variety of platforms, including most UNIX computers, VAXs, OS/2, MS-DOS and Windows, and the Macintosh. The program plots functions as well as data points. It does lines and histograms. It's worthwhile looking at this program if you need to plot data.

pbmplus

Pbmplus is a toolkit for converting various image formats to and from PBM portable formats. Because all the conversion is done to a reference format (the portable format), a small set of conversion tools can be deployed for converting from anything to anything.

Continued on Page 60

To convert an image from GIF format to GEM format requires converting from GIF to PBM followed by a conversion from PBM to GEM. I frequently want to print GIF pictures on my PostScript printer. The following single-line command performs this function:

```
cat $1 | giftoppm | ppmtopgm | pnmtops | lp
```

The software handles a large list of format types including Sun icon format, MacPaint, Group 3 Fax, GEM, HP LaserJet (for writing only), GIF, PICT, HP PaintJet, TIFF, etc.

The software is available from *export.lcs.mit.edu* in the */R5contrib* as file *pbmplus10dec91.tar.Z*.

GNU Manuals

As you probably know, the Free Software Foundation (FSF) is the source for many of the GNU programs such as emacs and gcc. Each source distribution includes the files needed to create the user manual associated with that package. However, converting the TeX files into PostScript for printing requires even more software and it is not always easy to build. FSF suggests you purchase manuals from them (remember, the software itself is free) as a means to help fund them. Nevertheless, if you need a quick user's manual and do not have the software in house to create the PostScript files, you might want to look at the files on computer *phi.sinica.edu.tw* in directory */pub/aspac/gnu*. You will find PostScript files for A4 paper format; included are some manuals the FSF does not yet publish.

COMP.LANG.PERL

swig v 1.0

If you are a Perl or TCL user, then look at this program. swig (Simplified Wrapper and Interface Generator) allows you to add scripting language interfaces to programs already written in C or C++. swig provides for variable linkage (access to C and C++ global variables), direct access to C/C++ functions, and automatic documentation generation in ASCII and HTML.

Swig is available via http access from *http://www.cs.utah.edu/~beazley/SWIG* or via anonymous ftp access from *ftp.cs.utah.edu/pub/beazley/SWIG*. Included is a user manual and a number of examples.

perlpdf-5.002g.tar.gz

William Middleton has uploaded a complete book of all of the standard Perl documentation. If you are interested in this (or other Perl goodies), you must first find the closest CPAN (Comprehensive Perl Archive Network) to you. A list of CPAN sites is available in file */pub/perl/CPAN* at *ftp.metronet.com*. I went to site *florida.edu*. The documentation was found as */pub/perl/CPAN/authors/William _J_ Middleton/perlpdf-5.002.tar.gz*. Browse around; you'll find lots of other Perl goodies there, too.

It appears that Mr. Middleton works for Adobe Systems (*wmiddlet@adobe.com*). He built his Perl documentation using Adobe's Acrobat format. Therefore, in order to access the documentation, you will need one of the Acrobat tools, either Acrobat Exchange or Acrobat Reader. The latter is available for free for HP-UX systems (as well as others). The source for this software is *http://www.adobe.com*.

COMP.LANG.POSTSCRIPT

c2ps v 2.8

On occasion I find a really neat utility in this newsgroup. If you only have a PCL printer, then you can skip reading about this program. But for those of you who do software development and have a PostScript printer, get this program. c2ps prints very nicely formatted C and C++ code on a PostScript printer. You can print one, two, or four logical pages on a physical page using a variety of fonts. The output is quite attractive.

The software was written by Dmitri Shtilman and Dmitri Makarov from the Technion University in Israel. Use a Web browser to access the software at *http://www.cs.technion.ac.il/~c0928189/c2ps/*.

WWW

http://info.pilgrim.umass.edu/

More and more people are beginning to use DCE as the middleware for creating distributed client-server applications. This Web site is the home of the University of Massachusetts at Amherst's Project Pilgrim, an advanced research and development project building a large-scale heterogeneous distributed computing environment based on DCE. Tons of information about DCE is available here.

http://catseye.bluemarble.net/

If you are not getting enough e-mail and somehow feel left out, then this is the Web site for you! This is the home of "Liszt," the directory of e-mail discussion groups. With e-mail discussion groups, you send a subscription request to the address of the

list server. Once subscribed, whenever anyone posts a message to a particular e-mail address, all subscribers to the mailing list receive a copy of that e-mail. If you are interested in seeing what kind of discussion/list groups exist, Liszt can help.

To see what it was like, I performed the search on "baseball." Ten matches were returned, including a mailing list for baseball coaches, a discussion group about the New York Mets, and a discussion group about the Texas Rangers baseball team.

One of my own favorite lists is a one-way (receive only) list from Israel that gives me a summary of the national news there. I get their e-mail at least once a day (Shomron News Service).

http://www.inquiry.com/

For software developers, this is an informative site that should be added to your bookmark list. This site includes over 100,000 articles from over 20 major publications. Vender information, technical tips, forums, and questions and answers are all available.

http://www.switchboard.com/

This really neat site has over 90 million names of everyone (so it appears) who is listed in any published telephone directory nationwide. This information is free. If you register, you can even add your e-mail address to your name as I did. There is also a listing of over 10 million businesses. ◧

Joseph Berry is a senior software developer at Landmark Systems Corporation in Vienna, Virginia. He is one of the authors of Landmark's PerformanceWorks products, PerformanceWorks/Smart Agents for UNIX. A former HP 3000 systems specialist for Hewlett-Packard, he has been in the computer industry for more 20 years. He can be reached at joe@landmark.com.

HP 1000 Guru

Q: I am trying to load a program for a different target system using the target system's snap file. I am getting the following undefined entry points:

```
$IDEXT
$IDNBR
```

What am I doing wrong?

A: Since these entry points exist only at Revision 6.0 and later, what you are doing most likely is crossing the 5.27/6.0 boundary. If the target system whose snap file you are using is at 5.27 or earlier, you cannot load programs for this system on a 6.0 or later system by using only the snap file. You must also use the corresponding libraries for the target. What is happening here is that the program is being loaded using 6.0 (or later) libraries, and these are referencing *$IDEXT* and *$IDNBR*, which are not being satisfied by the 5.27 (or earlier) snap file.

Now, even if you were to use the 5.27 libraries with the 5.27 snap file on a 6.0 system, the resulting program would not be usable on the 5.27 system. The reason is LINK. If you use the 6.0 LINK, it will create a program file with the ID segment structure for a 6.0 system. This is not compatible with a 5.27 system. If you really want to LINK programs for 5.27 or earlier on a 6.0 or later system, you need the following:

- 5.27 system snap file
- 5.27 Libraries
- 5.27 LINK (which may not work on 6.0 or later; I haven't tried this)

Q: I don't exactly understand using the NAMED program for DNS with MAIL on my RTE-A system. Can you explain the basics?

A: At the 6.0 release of RTE-A, Domain Name Service (DNS) support was added to the MAIL/1000 product for RTE-A. So let's first explain the basics of DNS.

DNS is essentially a centralized lookup service used to resolve a system name to an IP address. In the HP-UX world, it takes the place of the */etc/hosts* file. In the absence of DNS, the local host would need an entry in the */etc/hosts* file for any machine the local host expected to communicate with. This is cumbersome, since it means that all machines have their own */etc/hosts* file, which needs to be kept up-to-date with new machines and addresses.

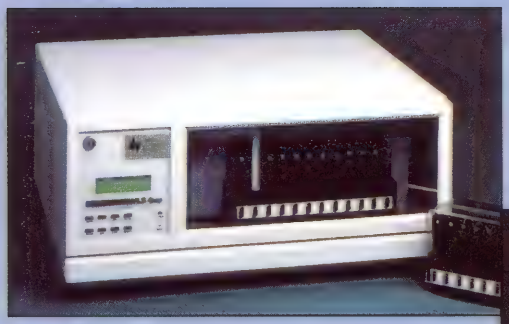
A Domain Name Server functionally replaces the individual */etc/hosts* file with a centralized machine whose purpose is to resolve name to IP address. This DNS machine is then used by all systems for name/address resolution. A site may have one or more machines configured as Domain Name Servers.

Continued on Page 64

Why not the BEST?

The BEST Products
The BEST Performance
The BEST Warranty
The BEST Value

Unattended Backup Solutions



Tape Library Autochangers
- HP 4mm DAT, Exabyte 8mm, 3480, QIC, DLT, S-VHS, and AMPEX DST 19mm drives
- Up to 600 cartridges per changer

Autoreply
- Allows any backup program to control Autochangers (TAR, CPIO, DUMP, FBackup, etc.)

QuadraJet
- **Tape Array** controller
- 400% increase in speed and capacity
- Automatic tape mirroring

UNISTORE®
- Unattended backup and Hierarchal Storage Management (HSM) for CA-UNICENTER

Backup Programs for UNIX and Novell
- Omniback and Omniback-Turbo, Hi-Back, Networker, ARCserve, Budtool, DATtool, OpenVbackup, and others

Storage Solutions

Disk Drives and Towers
- Fixed or removable drives
- Fast and Fast-Wide options
- HP disk mechanisms with 5-year warranties

Memory Expansion
- For HP 1000, 3000 and 9000

RAMdisk
- For HP 1000 and 9000

Optical Disk Drives
- Rewritable, Write Once, and CD-Recordable

Optical Disk Autochangers
- 3-1/2", 5-1/4" and CD (Up to 144 cartridges per changer)

Custom Solutions

Custom Device Drivers
- For HP 1000 and 9000

Custom Programming
- Consulting and Programming Services

Robotic Control Software
- With API, Interactive, and GUI interfaces

Call with your requirements!

CIRCLE 8 ON READER SERVICE CARD

"I promise you–no service hassles, no matter who is servicing your HP system."
Rick Walsh
CEO

HERSTAL
AUTOMATION

7414 Manatee Street
Sarasota, FL 34243-1824 U.S.A.
Phone: 1-941-358-2001 • Fax: 1-941-358-2010

HP-UX uses DNS for MAIL, telnet, ftp, etc. On the 1000, we implement only DNS for MAIL. It is not supported by any other NS/ARPA service at this time.

Now what is the purpose of NAMED? NAMED works in conjunction with a so-called "full service" DNS by locally caching information obtained from the DNS. When you configure DNS service on the HP 1000, you specify the IP address of either a DNS machine for your site or the local 1000 system that is running NAMED. This is configured in */etc/resolv.conf.*

If you use the local 1000 as the nameserver, then NAMED handles requests for name/address resolution. If NAMED has the address in cache, it then provides it to the requester. If it does not, then it makes a request of the "full service" name server specified in */etc/named.boot.* The advantage of using NAMED should be apparent. Requests that have already been cached in NAMED won't require any extra network activity accessing the "full service" DNS.

Q: Great, now I understand why I would use NAMED. What utilities are there that go along with Domain Name Service on the HP 1000?

A: Besides NAMED, there are two other programs supplied with MAIL/1000 They are: NSLOOKUP and SIG_NAMED .

NSLOOKUP is used to interrogate the Domain Name Server interactively for information. For example:

```
CI> nslookup
Default Name Server: hpwrcxe.mayfield.hp.com
Address: 15.37.241.3
```

When NSLOOKUP is scheduled, it first reports the name and address of the default Name Server being used. You can then enter a system name or an IP address, and NSLOOKUP will report the results as follows:

```
> mailhost
Name Server: hpwrcxe.mayfield.hp.com
Address: 15.37.241.3
mailhost.mayfield.hp.com canonical name = hpwcsdm.mayfield.hp.com
hpwcsdm.mayfield.hp.com internet address = 15.3.32.17
```

Here we asked for a machine named *mailhost* and the DNS reported back the machine's canonical name and IP address. In this example, the information came from the full service DNS. How do we know that? Look what we get when look up *mailhost* a second time:

```
> mailhost
Name Server: hpwrcxe.mayfield.hp.com
Address: 15.37.241.3
Non-authoritative answer:
mailhost.mayfield.hp.com canonical name = hpwcsdm.mayfield.hp.com
hpwcsdm.mayfield.hp.com internet address = 15.3.32.17
```

We get the same information, but this time, it is qualified as a "Non-authoritative answer." A Non-authoritative answer is obtained from NAMED's cache. Since NAMED's cache remains in memory until NAMED is restarted or the system is rebooted, it may be days or weeks since this information was obtained. If the IP address for *mailhost* were to change during this time, we would not be aware, since we still had the old IP address in cache. Thus this is a Non-authoritative answer.

SIG_NAMED is used to interrogate NAMED, and has three possible options:

kill This does as it says, shuts down NAMED
stats This dumps statistics into the file */scratch/named_stats*
dump This dumps a listing of NAMED's cache to the *file /scratch/named_dump.db*
Here's a sample statistic file:

```
named: Statistics listing generated Thu Apr 18, 1996  7:35:35 pm
6       queries received
2       queries forwarded (33%)
3       RR cache hits
0       non-existent RR cache hits
0       non-existent domain cache hits
```

And here is the cache dump:

```
named:  Cache dump listing generated Thu Apr 18, 1996  7:36:55 pm
mayfield.hp.com                 SOA
`exit`.mayfield.hp.com          [non-existent domain]
hpwcsdm.mayfield.hp.com         A 15.3.32.17
mailhost.mayfield.hp.com        CNAME hpwcsdm.mayfield.hp.com
3.241.37.15.IN-ADDR.ARPA         PTR hpwrcxe.mayfield.hp.com
```

More details on NSLOOKUP and SIG_NAMED can be found in the *MAIL/1000 Users Manual.* Or you might check in your HP-UX manuals since the functionality of these programs is virtually the same as on HP-UX.

Q: I have noticed that when the network activity on my site increases, my RTE-A system sometimes runs out of SAM. Once the network activity falls off, the SAM usage returns to normal. This is beginning to affect system performance. Is there anything I can do?

A: Yes. Frequently this condition is caused by excessive broadcast packets on the network. By default, the LAN card on the 1000 is usually configured to accept these broadcast packets, and if there is enough traffic, it can cause the 1000 to run out of SAM.

If broadcast packets are the problem, the solution is to change the packet filtering on the LAN card not to accept these broadcast packets. This can be accomplished in the following way.

Using Node Manager (NM), the RC command will display the current Packet Filter configuration:

```
NM> rc,,4
Read 802.3 Link Config of node          08-00-09-00-72-4C....
Receive Packet Filter          06
```

As you can see, the packet filter is set to 6. The possible values are listed in *Table 1.*

A setting of 6 means the card will accept Individual, Multicast, and Broadcast packets. To eliminate Broadcast packets, you can use a setting of 0 or 4. (Do not choose any setting that includes Promiscuous. Promiscuous means the LAN will accept any and all packets received. This can really eat up resources and cause network programs on the 1000 to receive packets not intended for them.) Multicast is a method of sending a single packet to multiple machines simultaneously.

To change the Packet Filter with NM, do the following:

```
NM> sc,,4,0
Set 802.3 Link Config of node           08-00-09-00-72-4C....
Receive Packet Filter          00
```

TABLE 1

Setting	Categories of Packets node will accept
0	Individual only (this is the card default)
1	Individual + Promiscuous
2	Individual + Broadcast
3	Individual + Broadcast + Promiscuous
4	Individual + Multicast
5	Individual + Multicast + Promiscuous
6	Individual + Multicast + Broadcast
7	Individual + Multicast + Broadcast + Promiscuous

Changing the packet filter using NM will be effective only until the system is rebooted. When NSINIT runs (assuming you are using NS/1000-ARPA 1000), it will reset the Packet to 6. You can add the following Control Request to your system welcome file, after NSINIT has executed, to set the packet filter on bootup:

```
CI> CN,<LU_OF_LAN>,37B,0,-20465,
```

where:

LU_OF_LAN	= 12076 card's LU number
37B	= Control request
0	= Desired Packet Filter
-20465	= a security code

For more information on using Node Manager and Packet filtering, refer to the *12076A LAN/1000 Link Node Manager Manual.* Information on LAN Driver control requests can be found in the *12079 LAN/1000 Link Direct Driver Access Manual* (part number 12079-90001, no longer available as far as I can tell). ◧

Walt Boeninger works in the HP Response Center in Mountain View, California. He has been supporting the HP 1000 for 15 years. His e-mail address is: walt@hpwrcxe.mayfield.hp.com

HP-RT

by Geff Blaha

Q: I am attempting to restore HP-RT to my hard disk after the disk crashed and was subsequently repaired. What is the correct method for restoring after a disk crash?

A: The process below will assist in creating a bootable DDS tape of HP-RT, and in performing a recovery restore to a connected HP-RT disk drive.

To create a bootable DDS tape:

1. Boot the HP-RT disk based kernel into SINGLE USER mode.
2. Log in as root.
3. Perform.

```
# dd if=/usr/lib/rtbootlf of=/dev/rdds0n bs=2k
# sync;sync
# dd if=/dev/rsd6 of=/dev/rdds0 bs=64k
```

4. Remove the tape.

To perform a recovery restore using the above DDS tape:

1. Boot the HP-RT processor to the "ISL>" prompt from the DDS tape created above.
2. From the "ISL>" prompt, perform

```
ISL> rtboot restore disk(scsi.6;0)
```

3. Boot the disk-based system after restore is finished and verify operation.

Note: Creating the recovery tape and restoring the system may take an hour or more to complete, depending upon the size of the disk.

The above processes assume the DDS tape drive devices are */dev/rdds0* and */dev/rdds0n* for SCSI address 0, and the disk drive device is */dev/rsd6* for SCSI address 6. Modify these devices as required for your system configuration.

Q: I have created a new kernel for my HP-RT disk-based system and have copied this kernel to disk, using the name */hp-rt_new*. I would like to autoboot this new kernel. I changed */usr/lib/rtbootlf* on my disk following the same instructions intended for a RAM-based system. When I tried to autoboot, it still booted */hp-rt*. What do I need to do to autoboot */hp-rt_new*?

A: The LIF file that is used when booting an HP-RT disk-based system exists in the reserved area on the disk. This is the file that needs to be modified. So, for example, if your SCSI disk is at address 6:

1. Copy the AUTO file from the system LIF volume to a standard HP-RT file.

Example:

```
(HP-RT)# lifcp /dev/rsd6:AUTO /tmp/auto
```

Note: The device file */dev/rsd6* is the raw SCSI device that addresses the whole disk drive.

2. Using vi, modify */tmp/auto* to include the new ISL command for booting. Example:

```
(HP-RT)# vi /tmp/auto
```

The file will probably contain the default ISL command line `rtboot`

Modify the above line to be

```
rtboot -a -rscsi.6 /hp-rt_new
```

The above will boot HP-RT in multiuser mode, using the root device "scsi.6", and the kernel "/hp-rt_new".

3. Remove the old AUTO file from the LIF volume:

```
(target)# lifrm /dev/rsd6:AUTO
```

4. Copy the modified */tmp/auto* file back to the LIF volume:

```
(target)# lifcp -r -T-12289 -K2 /tmp/auto /dev/rsd6:AUTO
```

Before you reboot, ensure that the new kernel */hp-rt_new* has execute capability, since FTP does not set this for you.

Now, when autobooting your HP-RT system from the SCSI disk, the new kernel */hp-rt_new* should boot.

Q: During the boot process, my HP-RT disk-based system panics. I see

```
panic : main file device not present
```

Then crash dump information is displayed. What could be causing this?

A: The panic is caused by the "root device" on your disk not being equivalent to the "root device" as defined on your HP-RT processor. If you know what this device is supposed to be on your disk, you may boot manually and specify the root device. For example, if your root device is "scsi.6" on your disk drive, the ISL command to boot manually and describe the root device is

```
ISL> rtboot -a -rscsi.6 disk()/hp-rt
```

The "-rscsi.6" describes the root device to be a SCSI disk at address 6. Once your system is booted successfully, you can check what has been stored in EEPROM on your system with the command

```
# /etc/showreboot
```

The output will look something like:

```
Boot Information (current boot):

  Boot flags              = 0x00000208
    RB_AUTOBOOT           = 0x00000008
    RB_GCACHE             = 0x00000200
  Root device string      = scsi.6
  CPU Number              = 1

  Boot Information in Stable Storage:

Operating System ID       = 4 (HP-RT)
Boot flags                = 0x00000208
  RB_AUTOBOOT             = 0x00000008
  RB_GCACHE               = 0x00000200
Root device string        = scsi.5
CPU Number                = 1

No crashdump device information
```

The section "Boot Information in Stable Storage" describes the "Root device string" to be "scsi.5", which is different from your real root device (scsi.6). To modify this parameter while HP-RT is executing, perform

```
# /etc/reboot -u -r scsi.6
```

The above command will modify the root device without rebooting your system. You can verify that this change has successfully occurred by executing */etc/showreboot* again.

Continued on Page 68

Q: I just received my 743rt processor and am in the process of installing it in my VME crate. I noticed no displayed output on the terminal console after applying power. I also see the green LED flashing at a steady rate. What error condition is this?

A: What you see is not an error, but an indication your 743rt is in "configure" mode. You should see data output on your console display. If you do not, there may be several things wrong:

1. The terminal is not properly connected to port A
2. The cable being used between port A and the terminal swaps pins 2 and 3, and should be a "straight-through" cable
3. The 743rt has the console set for GRAPHICS instead of a serial terminal
4. The 743rt has a hardware problem

Since the green LED is flashing normally, it is very likely the terminal or cable you are using is causing the problem.

As for the green LED, possible patterns are

- Steady flashing — Configure mode (normal)

Repeated at one second intervals:

- One blink — Processor failure
- Two blinks — RAM failure
- Three blinks — RS-232 failure (processor)
- Four blinks — No console identified

Possible patterns for the red LED are:

- Lights briefly, then off — Normal operation after boot
- Light remains on after boot — VME services failure

Once your 743rt has successfully booted HP-RT, the green LED will be on (no blinking), and the red LED will be off.

Q: How do I create a file system with 10,000 inodes on my HP-RT disk? Or, a file system with 4 disk blocks per inode?

A: Both tasks can be accomplished using *mkfs(1)*. To create a file system with 10,000 inodes:

```
# mkfs -v /dev/rsd4a 10000
```

To create a file system with 4 disk blocks per inode:

```
# mkfs -v /dev/rsd4a /4
```

The above commands affect a SCSI disk at address 4, partition 1 (a).

Q: When I create AF_INET sockets on HP-RT, I notice the limit for the number of sockets I can successfully create is NFILES, and not NSOCKETS. Why is this true? What does NSOCKETS describe?

A: NSOCKETS describes the number of socket table entries required for one type of socket, AF_UNIX SOCK_STREAM sockets. NSOCKETS does not define the number of available sockets, as described in *$HPRTroot/usr/include/sys/param.h*. AF_UNIX SOCK_DGRAM sockets do not consume a socket table entry, and thus, for each AF_UNIX SOCK_DGRAM socket created, a file is created, which means NFILES is the limiting parameter. NFILES is also a valid limit for AF_INET SOCK_STREAM and SOCK_DGRAM sockets, as these socket types do not consume a socket table entry.

Q: I want to install the HP-RT Developer's Kit on my HP-UX system, but it is running Revision 10.01. Is HP-RT compatible with this revision?

A: The HP-RT Developer's Kit, Revision A.02.20, is supported on HP-UX host systems at Revision 10.10. Revisions 10.00 and 10.01 of HP-UX are not compatible with HP-RT at Revision A.02.20.

Q: I presently have an HP-UX host system at Revision 9.05, and several HP-RT target systems at Revision A.02.11. What will I need to complete the update of my HP-RT systems to A.02.20?

A: You will first need to obtain an HP-UX host at Revision 10.10. This can be accomplished in several ways:

- Update your 9.05 HP-UX system to 10.01, then update to 10.10
- Back up all required files (configurable and user related), install 10.10 over your 9.05 system, then restore the previously saved files
- Install 10.10 HP-UX to a new processor and disk

Once you have a running 10.10 HP-UX system, install A.02.20 HP-RT on your 10.10 HP-UX system. Any configurable files and user files for HP-RT may be restored to this new version of HP-RT. Previous revisions of HP-RT (prior to A.02.20) will not work on 10.10 HP-UX. If you are updating HP-RT from a previous Revision to A.02.20, use the HP-UX utility *swinstall(1m)*, and specify the appropriate target path for HP-RT.

Q: Will I be able to upgrade or install HP-UX Revision 10.10, and use the HP-RT Developer's Kit for revisions prior to A.02.20?

A: Revisions of HP-RT prior to A.02.20 are supported only on Revisions 9.0X HP-UX. Due to many enhancements of the HP-UX system for Revisions 10.xx, HP-RT has been modified at Revision A.02.20 to be likewise compatible. HP-UX and HP-RT compatibility is as follows:

HP-UX	HP-RT
9.0x	A.01.00 through A.02.11
10.00	None
10.01	None
10.10	A.02.20

Q: When I create a new kernel with HPRTadm, I still have to add the HP-RT target to my */etc/bootptab* file. Will HPRTadm be enhanced to perform this task?

A: HP-RT Revision A.02.20 will include a new system administration tool, ADMrt. ADMrt has a Graphical User Interface (GUI) as well as a Terminal User Interface (TUI), similar to SAM on HP-UX. One of the capabilities of ADMrt is adding HP-RT target systems to */etc/bootptab*. This applies to both 743rt as well as 742rt processors. ADMrt manages the networking configuration on your HP-UX system, as well as the creation of HP-RT kernels. ADMrt simplifies system administration tasks, and replaces HPRTadm as the primary tool for system administration within the HP-RT Developer's Kit.

Q: Is there a Web site available for HP-RT?

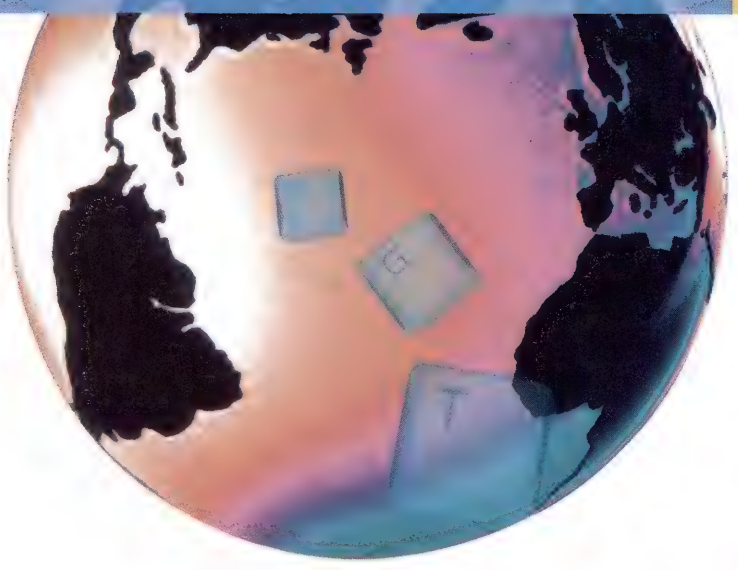
A: Yes, there is. The URL (uniform resource locator) is

http://www.hp.com/computing/hprt/main.html

From this page, you can obtain more information regarding the HP-RT operating system and associated processors, complementary vendors, marketing support, and upcoming events. You can even sign in at the registration desk! ◧

HP-RT Operating System questions are answered by Geff Blaha, a support engineer in the HP-RT Expert Center. He has worked with and supported real-time systems for over 18 years as a Customer Engineer, Real-Time Response Center Engineer, and HP-RT Expert Center Engineer. He can be reached at geff@hpwrch.mayfield.hp.com.

Training Seminars



Do you need practical, ha technologies in your comp seminars are designed for

For computing professionals utilizing HP 9000 technology, here's an in-depth look at a few of the seminars most applicable to your environment.

HP WORLD '96

August 4 – 9, 1996
Anaheim, California
Anaheim Convention Center

Packed with the real-world experience you need to get up to speed on many of today's most critical issues, HP WORLD '96 training seminars are some of the most valuable seminars of the year. Here's a list of the seminars you can attend Monday, August 5, 1996:

- Building a Web Site
- Using Information Technology for a Competitive Advantage
- Network and System Management for HP-UX 10.0
- Distributed Computing Technologies and Products
- Positioning, Configuring, and Interoperating in a Heterogeneous UNIX/Windows NT Environment
- HP-UX and Internet Security
- Data Warehousing
- Second-Generation Client-Server Technology
- Introduction to Visual Basic
- Creating Market-Focused Products
- Enabling Technologies for Supply Chain Management

Network and System Management for HP-UX 10.0

Many new tools and features that have been introduced with HP-UX 10.x make managing the system easier and provide added flexibility for the system and network administrator.

Who should attend:

System Analysts, System Administrators, Network Administrators, and Information Systems Supervisors who are implementing or planning systems using HP-UX 10.x will benefit from this program. Familiarity and experience with HP-UX 9.0 and 10.0 basic features is assumed.

After completing this class, you will be able to:

- Identify ways to utilize the new HP-UX 10.x features
- Develop strategies and tactics for implementing 10.x environments

Positioning, Configuring, and Interoperating in a Heterogeneous UNIX/Windows NT Environment

More and more organizations must now implement and configure networking services in a heterogeneous environment of UNIX servers, Windows NT servers and clients, NetWare clients, and Windows clients. Knowing how to set up consistent and manageable interoperability in this kind of environment is challenging, but necessary to achieve a successful enterprise environment. This seminar offers practical insights into interoperability issues such as file and print services, security, and system backup and recovery in a multivendor enterprise.

designed to keep you ahead

nds-on information in order to implement new uting environment? Then HP WORLD '96 training you.

Who should attend:

System Administrators/Integrators and IT Technical Staff/Consultants who need a practical approach to achieving systems integration in mixed environments.

After completing this class, you will be able to:

- Articulate how to position UNIX, Windows NT, and even NetWare platforms within a corporate IT infrastructure
- Configure and troubleshoot TCP/IP interconnectivity to the network on UNIX and Windows NT
- Set up Telnet FTP and NFS in a mixed UNIX and Windows NT environment
- Understand the redirection of spool queues between UNIX and Windows NT
- Back up all servers in an integrated environment from a single utility

HP-UX and Internet Security

Security is important to everyone who keeps important and sensitive information on an HP-UX system. Over 90 percent of HP-UX security problems can be solved with attention to good user and administration practices. Connection to the Internet poses additional problems and dangers. This course focuses upon practical procedures that can strengthen the security of networked HP-UX systems. The security mechanisms of the UNIX system, in particular HP-UX, are explained with examples.

Who should attend:

People who are responsible for system and/or network administration and planning and design of security policies, and managers responsible for site security of networked HP-UX systems.

After completing this class, you will be able to:

- Improve the security of HP-UX systems at your site
- Recognize the signs of a break-in
- Detect hidden code that may have been added to your system by crackers
- Update your site policy with regard to HP-UX security
- Audit your systems for security problems
- Choose a safe means for controlling Internet access

In addition to the seminars, you'll also discover a world of HP-related information by attending the main conference sessions focusing on the following tracks:

- Operating Systems/Hardware Technology
- Networking Technology
- Database Technology
- Development Technology
- HP Computing Management

To register or learn more about HP WORLD '96 call 1.800.990.EXPO, 1.408.747.0227 or e-mail us at conference@interex.org.

interex

Shared Knowledge.
Shared Power.

Interex Online

WWW at http://www.interex.org/
or call 1.800.INTEREX, or 408.747.0227

CSL Perspective

At one of our recent group meetings we became acquainted with a concept called "legendary service." In a nutshell, it is a set of attitudes, values, and processes that, applied together, will result in service that people talk about. Over the years I've been fascinated with this area, having been turned on to it after seeing Tom Peters, co-author of *In Search of Excellence.* The stories in many of Mr. Peters' books make fascinating reading, although I will admit that they make me a little jealous. It would be great to work in some of these companies or to buy products or services from them. But then as I look around at the stores I shop in and the services I buy, I see so much opportunity for improvement. Even in my own organization, there are tons of opportunities, but we can never seem to get started.

I've always been a firm believer in setting personal goals and meeting unique challenges. Underlying these goals has been a set of personal values and principles that I use as guideposts in setting my goals and then reaching them. It is the integration of our own values and principles coupled with those of our organizations that is the foundation upon which legendary service is built. Values such as trust, integrity, credibility, loyalty, and courtesy form this foundation. As we come to a common understanding about what these values represent to us, we can begin to put them into practice daily. Let me illustrate with an example.

A large part of my day-to-day responsibilities includes taking calls from system administrators or users when they encounter very difficult problems. In order to maximize the assistance I give, I begin to poke around a system, making changes that will ultimately solve the problem. That user trusts me to be there, knows from past experience and reputation that I can fix the problem, and is confident that all will be well soon. Despite the fact that I'm very much aware of the trust level and am very careful about how I work, I still make mistakes. My personal principles dictate that I be up-front about the mistake, that I'm thorough in remedying my error, and that I work hard at preventing a repeat occurrence. If I've shattered the trust of my customer, I'm now on the road to regaining that trust. I've also maintained a level of integrity with my other customers since they know that I will deliver what I promise when their time for service comes.

I'm sure there are many other examples of these attitudes that apply to one's work. Take some time and come up with your own list of values.

I'm interested in hearing from you. Please feel free to share your stories and your thoughts in this area. I would especially be interested in how you view the user's group, and the CSL in particular. Where might we be failing to meet your expectations in delivering quality, timely, and cost effective services. What would it take for us to be legendary ?

Our annual conference is coming up August 4th through 9th in Anaheim (that's the home of Disneyland, by the way). I hope each of you has the opportunity to bring a contribution for the swap tape. Just bring your software on tape and drop it off at the Interex booth on Monday, August 5th. ◧

Paul Gerwitz is chairman of the CSL committee and is a technology specialist at Eastman Kodak Company in Rochester NY. He can be reached at 716-477-3067 or e-mail at gerwitz@interex.org or gerwitz@kodak.com

The New Vikon.

Full strength UNIX on-the-go!

HEWLETT® PACKARD
Channel Partner

- ❑ 13" 1280 x 1024 VUEpanel™
- ❑ 100 MHz HP PA-RISC
- ❑ 192 Mb RAM, 10 Gb disk
- ❑ Three internal bays
- ❑ DC power & rackmount option

Have you been yearning for an easy to tote system with *full* UNIX capabilities? The new Vikon™ is your answer. It's a Hewlett-Packard PA-RISC powered SuperTransportable® with a *real* workstation display.

It's for savvy, on-the-go professionals who need a TransportableWorkstation™ for on-the-site solutions, or those who simply need *full* strength™ UNIX *and* portability. The Vikon is small enough and light enough to go wherever you need to be. And, when you get there, you'll have a *real* UNIX workstation at your command.

The VUEpanel display will reward you with crisp, brilliant images. PA-RISC delivers power and performance, while HP-UX provides the application solution base you're looking for. And, it's portable!

So, when you're on-the-go and need a full strength UNIX platform by your side, the Vikon is your answer. It's from SEJUS.® A Hewlett-Packard authorized VAR, serving the HP community since 1986. Call us now for more information.

SEJUS... providing better solutions.®

SEJUS

SEJUS CORPORATION
2618 PALISADES CREST DRIVE
LAKE OSWEGO, OR 97034-7550 USA
PHONE 503.638.9000 FAX 503.638.9009

CIRCLE 126 ON READER SERVICE CARD

Industry Watch

NEVER MIND WHAT WAS in the air this past Spring, let's talk about what was "on the air." At the National Broadcasters Convention in Las Vegas, digital video was blossoming, highlighted by several new product introductions.

Silicon Graphics claims to have a complete solution for the production, compression, storage, and distribution of digital video. Using their CHALLENGE Media Servers as the platform, SGI has teamed up with more than a dozen partners to offer everything from RAID and tertiary storage subsystems to multichannel television automation and near-video-on-demand (NVOD). It's an impressive list of technical capabilities—Louth broadcast automation, on-the-fly statistical multiplexing, and digital imaging for TV/film effects, as well as important support capabilities including asset management, storage, digital distribution, and so on.

HP was not only showing off the state-of-the art but they introduced a migration plan to help broadcasters move into the new technology without tossing their existing systems. The strategy is to provide an open, interoperable infrastructure, interfaces between this infrastructure and third-party applications, and integration with legacy systems. HP's infrastructure would include servers, network, video compression, and communications. A central figure here is the HP MediaStream Server for broadcast, which provides digital storage and playback and up to six channels and 50 hours of video. In addition, HP is working with software partners to offer solutions for news, on-air automation, and production and station operations.

Digital was sending out signals of their own with the introduction of three new products—the AlphaStudio Broadcast System Software, AlphaStudio Content Server, and AlphaStudio REV Station. The system software, which manages and controls the location and movement of digital video data, runs in the 64-bit RISC Alpha, Digital UNIX environment. The content server replaces the analog video systems with digital disk and tape archives. And the REV station is a direct digital replacement for analog VTRs, supporting multiple bidirectional audio/video channels that can simultaneously access video storage.

Stepping out of the air waves into the enterprise, we find a wave of new performance reports. Compaq claims to have set a new price/performance record for its ProLiant series with Microsoft SQL Server 6.5. With a price/performance result of $148/tpmC and database performance of 3641 tpmC, Compaq appears to have taken the lead in this class. HP scored higher at 3809 tpmC with Oracle 7 on the K410 but price/performance, at $364/tpmC, was not as good. Digital's price/performance was nice, at $196/tpmC, but placed third on the AlphaServer 2100 5/300 with SQL Server 6.5 at 3194 tpmC. IBM wasn't too far behind at 3119 tpmC for the PowerServer J30 with DB2 for AIX.

Ratcheting up a notch or two, Digital announced a record-breaker of their own. A cluster of four AlphaServer 8400 5/350 systems, running Digital UNIX and Oracle Universal Server with Oracle Parallel Server, soared to 30,390 tpmC at $305/tpmC. Dubbed the Digital UNIX TruCluster Solution, the package includes 32 processors and 32 GB of memory and claims to be 1.5 times faster and one-third the cost of the previous leader, the Tandem Himalaya K10000-112. Digital also says the TruCluster is

540 percent faster and 20 percent less expensive per tpmC than the HP T500/12, 481 percent faster and 36 percent below the $/tpmC of SGI's Challenge XL/16, and 593 percent faster with 6 percent better price/performance than Sun's SPARCcenter 2000E/16.

Finally, getting down to the nitty-bitty in the record-breaking department, HP says they've taken the lead by up to 260 percent with the PA-8000 64-bit chip. With a SPECint95 of 11.8 and SPECfp95 of 20.2, the PA-8000 edged out Digital's Alpha 21164 with a SPECint95 and SPECfp95 of 11.7 and 15.9, respectively. IBM, Sun, and MIPS trailed on this one: IBM PowerPC620 at 5.6 and 5.6, Sun UltraSparc at 5.6 and 9.1, and MIPS at 8.9 and 12.5 for SPECint95 and SPECfp95, respectively. ◧

James H. Gamble is a freelance writer and communications consultant for technology-based product and service companies. He can be reached by phone at 603-673-1904 or by e-mail at jhg@mv.mv.com.

New Products

UNIX Ink-Jet Printing

Vividata, Inc. has announced PostShop, which enables high-quality UNIX applications and images to be printed out on low-cost color printers such as ink jets from HP and Canon. Included in PostShop is a PostScript Level 2 software raster-image processor and 35 premium printer fonts. The supported printers, including portable models, are fully controlled by PostShop for optimal output color, density, positioning, and brightness.

PostShop prints from popular UNIX applications (like Netscape, Word Perfect, Applixware, FrameMaker, WABI, and Interleaf) and from screen captures. It automatically detects the file formats of the images and documents sent to its print queue.

PostShop is available for HP-UX and other UNIX platforms and supports over 150 printers, including dye sublimation, thermal wax, laser, and ink jet models. PostShop works stand-alone and in client-server networks. PostShop is priced from $200 to $1,600, depending on configuration.

Contact Vividata, phone: (510) 841-6400, fax: (510) 841-9661, e-mail: info@vividata.com, http://www.vividata.com.

Storage Management

Legato Systems, Inc. has announced NetWorker Version 4.2, which combines automated storage capacity management with data protection management. With NetWorker 4.2, administrators now can manage the "virtual network," in which data is highly distributed, storage capacity is limited, and users are highly mobile.

Legato also introduced NetWorker StorSuite, storage management applications consisting of backup, archive, and hierarchical storage management that can be installed in conjunction with NetWorker. With NetWorker StorSuite, administrators can reduce administrative overhead while leveraging sophisticated storage management tools.

Additional NetWorker options automate the storage management process; protect high-capacity, online databases; link to mainframe systems; or link to numerous system management frameworks such as HP OpenView and other frameworks.

NetWorker StorSuite, including backup, archive, HSM, SNMP autochanger, and 10 client connections, is priced at $24,000 and runs on HP-UX and other open systems.

Contact Legato Systems, phone: (415) 812-6000, fax: (415) 812-6032, http://www.legato.com.

New from O'Reilly & Associates

Perl 5 Reference

O'Reilly & Associates has released *Perl 5 Desktop Reference*, an easy-to-use reference guide to the Perl programming language. Perl—a language for easily manipulating text, files, and processes—has established itself as the UNIX programming tool of choice since its creation nearly a decade ago. World Wide Web programmers are also using Perl as their language of choice. For $6.95, the *Perl 5 Desktop Reference* provides a complete overview of the language, from variables to input and output, from flow control to regular expressions, from functions to document formats.

Author Johan Vromans has engaged in software engineering research since 1975. He is an expert in using GNU Emacs and Perl.

Perl 5 Desktop Reference by Johan

Alex meets DLT...

Come Visit Us At HP World '96 Booth #529

and they back up at full speed

Now IEM offers Alexandria Network Backup Librarian with high-speed DLT libraries, so you can relax while your network backs up FAST! With DLT4000 drives, the single drive transfer rate is up to 3 MB/sec. with 2:1 compression; with 9 drives, the library throughput is up to 97.2 GB/hour! DLT4000 cartridge capacity is 40 GBytes with 2 :1 compression.

Alex backs up to DLT libraries with 2 to 9 DLT4000 drives and 28 to 264 cartridges.

These libraries are so reliable that they include a full one-year on-site warranty with next business day response.

Alex also backs up to IEM's 4mm and 8mm carousels and autofeeders, as well as 3480 tape libraries and HP's optical libraries.

Alex supervises every facet of your heterogeneous UNIX network backup:

- Organizes and automates your system backups
- Manages all of your backup media
- Performs cold database backups of Oracle, Sybase and Informix databases
- Performs hot backups of Oracle databases with an additional module

IEM: Providing Solutions for a Lights-out Environment

IEM

In the U.S. and Canada:
IEM, Inc., P.O. Box 1889
Fort Collins, CO 80522 USA
Phone: (970) 221-3005
(800) 321-4671
Fax: (970) 221-1909

In the United Kingdom:
IEM, Inc., Unit 6, Salisbury House,
Wheatfield Way, Hinckley Fields,
Hinckley, Leicester LE10 1YG
Phone: +44 (0)1455 239000
Fax: +44 (0)1455 239668

All others:
IEM International Sales
1629 Blue Spruce Drive
Fort Collins,CO 80524 USA
Phone: +[1] 970-221-3005
Fax: +[1] 970-221-1909

email: info@iem.com

http://www.iem.com

CIRCLE 17 ON READER SERVICE CARD

Graphical Applications Toolset

DataViews DV-Xpresso

DataViews Corporation has announced an agreement with Visual Edge to bundle their UIM/X GUI Builder with DV-Xpresso. UIM/X is a GUI Builder for OSF/Motif. DV-Xpresso is a complete set of object-oriented tools to rapidly build graphical applications to monitor and control complex processes.

The DV-Xpresso graphics builder enables users to build animated graphical drawings that, when integrated into a widget, can provide a complete interactive environment for process control, monitoring, and simulation applications. Features available include table widgets, real-time 3D shading and hidden surface removal (using the Z-sorting technique), grouping and traversing an object's hierarchy, editable color and font tables, and double buffering.

DV-Xpresso with UIM/X prices start at $6,500. OEM and volume discounts are available.

Contact Visual Edge Software, Ltd., phone: (514) 322-6430, fax: (514) 332-5914.

Vromans (ISBN: 1-56592-187-9) is priced at $6.95.

Secure Computing Guide

O'Reilly & Associates has released a second edition of *Practical UNIX & Internet Security*. This new edition is a complete rewrite of the original book. It is packed with twice the pages and covers the features of most UNIX systems, including HP-UX.

Practical UNIX & Internet Security thoroughly describes the issues, approaches, and methods for implementing security. It describes how to set up basic security policies and procedures to protect a UNIX system, network, and Internet connection from unauthorized users. The book explains in detail the ways that intruders can get into a system, as well as how to detect them, clean up after them, and even prosecute them if they do get in. It is complete and usable by programmers.

Practical UNIX & Internet Security, 2nd Edition, by Simson Garfinkel and Gene Spafford (ISBN: 1-56592-148-8), is priced at $39.95.

Contact O'Reilly & Associates, phone: (800) 998-9938 or (707) 829-0515, fax: (707) 829-0104.

Web Database Applications

JYACC has announced JAM/WEB (Web Enterprise Builder), designed to enable developers to build server-based database applications for the Web. Developers can build the client and server components of Internet/intranet applications and can build virtual JAM/WEB "forms" and deploy them on a server system. JAM/WEB automatically converts the forms into HTML for display on a browser. When the end user finishes with the form, the request is passed to JAM/WEB for servicing. The JAM/WEB application executes the business logic and generates SQL to the back-end database.

Screens developed with JAM/WEB can be deployed as thin clients on any Web browser. JAM's ODBC and database drivers provide native access to leading database engines.

JAM/WEB's capabilities can be extended into three-tier environments using JYACC's JAM/TP*i* for TUXEDO product.

Contact JYACC, phone: (212) 267-7722, fax: (212) 608-6753.

Query and Reporting Tools

Unidata, Inc. has announced new versions of Interactive Software System's (ISSI) User Data Management System (UDMS) report-generation and query tools, including VisualRPW, a GUI to UDMS.

UDMS Release 5.1 is designed for users, analysts, and programmers needing understandable views of complex environments, hierarchical data structures, inner or outer joins, and multiple file structures. UDMS enables users to define complex multilevel sorts, control breaks, and 3GL and 4GL functions. The centralized data dictionary manages data access, security, and storage of shareable definitions at the server level.

UDMS's uniform interface provides connectivity between databases and software applications. It integrates both relational and nonrelational databases and provides interoperability with existing legacy systems.

UDMS is available for HP-UX and other operating systems.

Contact Unidata, phone: (303) 294-4828, fax: (303) 293-8880, e-mail: unidata @unidata.com, http://www.unidata.com.

Financial Decision Making

SAS Institute has announced the SAS Business Solution for Financial Consolidation & Reporting, a complete Business Solution to support successful financial decision making. It integrates data warehouse and OLAP

techniques in a targeted application for financial professionals.

The SAS Business Solution for Financial Consolidation & Reporting provides a seamless alternative to the task of joining together a collection of "best-of-breed" tools. The new SAS Business Solution combines data warehousing, multidimensional analysis, and EIS functionality with regulatory and management reporting in a single package. It can be rapidly implemented for successful decision making and used either as a stand-alone application or integrated into other information delivery applications developed with the SAS System.

Contact SAS Institute, phone: (919) 677-8000.

Project Managers

Micro Planning International (MPI) has announced the latest versions of its project management software for the Macintosh, UNIX, and Windows: MICRO PLANNER X-Pert Version 2.4.1 and MICRO PLANNER Manager Version 1.4.1.

The automatic progressing features eliminate the need to key in progress for each task. MICRO PLANNER X-Pert 2.4.1 and MICRO PLANNER Manager 1.4.1 offer selective archiving that allows old project baselines to be removed, new project baselines to be added, and existing baselines to be changed with ease.

MICRO PLANNER's new analysis engine works up to 10 times faster. Users can now choose between batch analysis or "on the fly" analysis that automatically incorporates any project change. Also offered is background analysis, which works behind the scenes so the project manager can continue working without interruption.

MICRO PLANNER X-Pert retails for $1,995. MICRO PLANNER Manager retails for $695.

Contact Micro Planning International, phone: (800) 852-PLAN or (303) 757-2216, fax: (303) 757-2047.

CAD Translator

Theorem Solutions Ltd. has announced CADverter for AutoCAD Designer. This translator reads and writes native 3D data, including solids, to and from Computervision CADDS 4X/5, Catia V3&4, EDS Unigraphics II v9.1 and up, and Parasolid V4.3 and up. All are host-independent.

Engineers can now reliably exchange 3D data independent of normal platform restrictions. All types of 3D entities are supported. Solids conversion, repair, and healing methods are based on Theorem Solutions algorithms that resolve the precision and tolerance issues intrinsic in the conversion of solid models.

CADverter for AutoCAD Designer sells at $9,750 for single-unit orders; volume discounts are available. It works

in HP-UX and other UNIX environments and on Windows NT.

Contact Segue, Inc. (Theorem's North American sales office), phone: (513) 831-8009, fax: (513) 576-0423, e-mail: 75017.1764@compuserve.com; http://www.iac.net/~segue.

New from HP

NT Server Network Operating System

HP has announced it is shipping AT&T's Advanced Server for UNIX systems—NT Server's NOS (Network Operating System) and domain functions—on its HP-UX-based workstations and servers. HP's Advanced Server/9000 integrates client and workgroup devices into an HP-UX-based network operating system that is HP's implementation of the next-generation of Microsoft's LAN Manager.

For the same price as NT Server, HP's Advanced Server/9000 provides NT's file- and print-management and security features for the following clients: Windows NT, Windows 95, Windows for Workgroups, and LAN Manager. In addition, these features are provided by a robust enterprise-class operating environment, HP-UX, which offers superior performance scalability, high availability, and manageability.

As workgroups migrate to an NT environment, Advanced Server/9000 offers protection of UNIX system investments as well as a single-system solution for PC Server and enterprise integration requirements. Today, Advanced Server/9000 supports HP's internal requirements for PC and UNIX system integrations.

HP's Advanced Server/9000 features network file and print sharing for MS-DOS, MS Windows for Workgroups, MS Windows NT and Windows 95 clients, interoperability with MS Windows NT servers as primary or backup servers for NT client log-on validation and for file replication, administration based on MS Windows NT Server Tools, and Windows NT security at the user level.

Prices for Advanced Server/9000 range from $1,020 to $29,900. A two-user license for the HP-UX 10.0 runtime environment is bundled with HP workstations and servers, with additional license levels available.

Internet Security Framework

HP has introduced the Praesidium Authorization Server, security software designed to help guard against intranet computer fraud. The Praesidium Authorization Server centralizes network security, placing authorization rules on one server. Administrators can then assign specific access privileges to each user within an enterprise. The authorization server is the first of HP's Praesidium product line dedicated to Internet security.

The Praesidium product differs from existing authorization security solutions, HP says, in that it replaces customized programming code implemented in every application with one system containing "smart" business rules. Because the rules do not reside in applications on the users' systems, users cannot gain control of access privilege information. A simplified GUI enables an administrator to manage application user security, without programming. Praesidium can also be managed centrally over the enteprise network via HP OpenView.

Rules and permissions that can be stored in the server include access times; dates; transaction limits, for example, a $500 limit; particular account/customer

Workstation Direct DRAM memory modules

Memory Modules

Workstation Direct has introduced DRAM memory modules designed for HP 9000 and HP 3000 workstations and servers. The company now offers DRAM modules for easy, low-cost memory expansion for the following HP 9000 Series C, D, and J class workstations; Models 755, 750, 735, 730, 725, 715, 712, 710, and 705 workstations; Series E, F, G, H, I, and K class servers; and 8x7S servers. HP 3000 9x8, 9x7, and 9x7LX Series modules are also available.

Workstation Direct manufacturers memory upgrade kits ranging from 32 MB to 128 MB. These modules have been tested with the HP hardware for which they were designed, ensuring 100-percent compatibility.

Workstation Direct memory modules are designed to meet or exceed OEM specifications and carry a lifetime warranty.

Contact Workstation Direct, phone: (888) 610-1600, fax: (303) 413-0580.

numbers; or a range of accounts. Roles for classes of users can exist along with an individual's set of authorizations. These authorizations—which can be based on nearly any combination of variables, such as geographies, identities, times, and dates—can be modified easily, without reprogramming, as business conditions change.

Praesidium is priced from $30,000 to $50,000 and runs on any HP 9000 server using HP-UX 10.01. Praesidium Release 1.0 uses a distributed computing environment (DCE) security cell to authenticate and log in users. Praesidium Release 1.0 works with non-DCE applications. Release 2.0, running without the DCE security cell requirement, is expected to be available in the second half of 1996.

Praesidium supports HP-UX 10.01, Windows NT 3.5, or Windows 3.11 clients. Application servers authorized by Praesidium may run HP-UX 10.01 or Windows NT 3.51.

Distributed WAN Monitoring Solution

HP has introduced its NetMetrix distributed WAN monitoring solution. The new solution, based on Windows 95, Windows NT, and UNIX operating systems, extends the reach of IT managers into frame-relay, point-to-point, and packet-switched links to help them "see" the traffic performance of their internetworks.

Designed for use in large, multisite, multivendor, and multiprotocol environments, the HP NetMetrix distributed WAN monitoring solution incorporates mid-level manager applications for scalability; stand-alone probes to access and monitor remote links; a de facto standard WAN management information base for reporting utilization, trends,

Altia Design 2.0

Feature Prototyping Software

Altia, Inc. has announced Altia Design 2.0, a feature prototyping tool that creates functionally complete computer-based prototypes for use in market research. Feature prototyping provides a complete interactive model that can simulate and test the behavior of products. Altia Design 2.0 enables the creation of these models without the need for programming skills, enabling marketing professionals, human factors engineers, system architects, and industrial designers to do prototyping.

Altia Design 2.0's DXF Reader allows the prototyper to import CAD designs, saving graphics drawing time and improving prototype accuracy and realism.

In addition, Release 2.0 provides a free unlimited runtime player, which enables third parties not running Altia Design on their system to view the prototype and interact with the product without paying royalties or extra license fees to Altia.

A complete Altia design system costs $5,900 for the PC and $9,900 for UNIX workstations. Altia Design 2.0 runs under Windows 3.x, NT, or 95, and HP-UX and other workstations.

Contact Altia Design, phone: (719) 598-4299, fax: (719) 598-4392, http://www.altia.com.

congestion indicators, and event notification; and planning and reporting capabilities.

Detailed historical information on network usage, traffic, and bottlenecks permits IT managers to grow, optimize, maintain, and improve the delivery of frame-relay, point-to-point, and packet-switched X.25 network services. HP NetMetrix Distributed WAN Monitoring tracks more than 20 applications, including WWW, ftp, telnet, mail, news, and Gopher, to get a clear picture of traffic patterns. This information, along with Internet usage patterns, can help IT managers justify frame-relay network circuit additions, bandwidth reallocation, and network-service billing.

The HP NetMetrix/Win32 for WAN, a stand-alone application for Windows 95 and Windows NT, is $4,995 and is available now. Probes for monitoring T1 and V-series links also are available now and range from $3,300 to $7,200, depending on the performance levels needed. Client applications for UNIX systems are priced at $5,500.

Uniplex and HP Agreement

HP and Uniplex Software, Inc. have announced a strategic alliance whereby Uniplex's onGO Document Management System (DMS) Version 2.0 will be jointly marketed by both companies. The first fruits of the Uniplex/HP relationship will be in the Korean market, where onGO DMS will be localized, marketed, and sold by HP.

In Korea, HP will sell both a stand-alone version of onGO DMS as well as bundle it with HP OpenMail. The onGO DMS integration with OpenMail includes OpenMail directory support and DMS support for messaging systems. Routing and notifications of document references within onGO can be sent to the OpenMail users' In Tray.

The first of a new generation of server-based onGO applications, onGO DMS manages all documents throughout their useful lives and delivers the information in a secure, scalable client-server environment.

OpenMail is HP's strategic enterprise-messaging system, designed to accommodate heterogeneous environments and large user populations with maximum reliability. It supports various clients, including cc:Mail, MS Mail, and others on Windows, NT, Macintosh, and UNIX desktops. Additionally, OpenMail now includes enhanced privacy, data integrity, and authenticity features through integration with Northern Telecom's security solution, Entrust.

Remote Network Monitoring

Peregrine Systems, Inc. has announced remote network monitoring (RMON) tools that analyze and troubleshoot Ethernet and Token Ring networks from a central SNMP-based management console. The Peregrine RMON Manager for HP OpenView or IBM NetView for AIX is an SNMP management application that controls RMON probes across the enterprise. The Peregrine RMON Manager includes automatic creation of SQL tables on the server (Oracle, Ingres, or Sybase) as RMON data is collected from the probes.

The Peregrine RMON Manager provides true integration with HP OpenView or IBM NetView for AIX network management platforms, not just a "launchable" application. RMON-equipped nodes are registered as such in the object database, permitting standard platform tools to be used to locate and manipulate probes on the map.

Any number of RMON probes can be managed simultaneously.

The Peregrine RMON Manager is $7,995. Agents are sold on a per-agent basis.

Contact Peregrine Systems, phone: (800) 638-5231 or (619) 481-5000, fax: (619) 481-1751.

Mailing Software

Group 1 Software has announced CODE-1 Plus Version 1.4.2, which enables users to automatically submit jobs for execution on a UNIX platform. GUI and character-based interfaces are available.

CODE-1 Plus 1.4.2 allows users to define an input file once and then use that definition for multiple jobs. Businesses can now standardize and correct U.S. addresses and validate zip codes against the USPS National Database for maximum deliverability and maximum postal discounts.

CODE-1 Plus can operate in either a batch or online mode. When provided with a proper zip code and limited address information, the system can return a complete verified, standardized address in more instances.

CODE-1 Plus is available for HP 9000s and other computers. CODE-1 Plus lists from $10,000 to $42,000, depending upon the volume of addresses being processed.

Contact Group 1, phone: (301) 731-2300 or (800) 368-5806, fax: (301) 731-0360.

Rapid Prototyping

Stratasys, Inc. has announced three new rapid prototyping products.

Genisys, the 3D printer, is based on the technology Stratasys acquired from IBM in January 1995. Designers can "print" concept iterations directly from a workstation. AutoGen software orients and scales the part, slices the data, and

PCMCIA Modem Servers

Central Data EtherLite Modem Server

Central Data also introduced the *EtherLite* Modem Server, a PCMCIA-based modem server that connects to an Ethernet TCP/IP network. The product is shipping for Windows NT, HP-UX, and other open platforms.

The *EtherLite* Modem Servers (EM-8 and EM-16) provide slots for 8 or 16 PCMCIA modems, operating at up to 28.8 K. They connect to any TCP/IP network via standard 10Base-T Ethernet. Up to 16 PCMCIA modems reside in a single box. The slots are hot-swappable, making modem upgrades a snap.

EtherLite Modem Servers use FLASH EPROMs for fast and easy firmware upgrades in the field.

The EM-8 provides 8 Type II PCMCIA slots, while the EM-16 has 16 Type II slots. They can be rack-mounted or stacked on a desktop if more than 16 modems are needed. The list price for the EM-8 is $1,695, while the EM-16 lists for $2,395.

Contact Central Data, phone: (217) 359-8010 or (800) 482-0315, e-mail: markd@cd.com.

automatically builds parts with a simple point-and-click command. It prints up to 203x203x203 mm. (8x8x8 in.) and can be produced in a plastic polymer material. The Genisys product is priced in the $50,000 range.

The FDM1650 is a continuation of the original Stratasys-patented Fused Deposition Modeling (FDM) technology, with speed improvements three times that of earlier FDM systems. QuickSlice 2.0, the proprietary operating software for Stratasys, orients and slices the model and generates tool paths for the build process. The FDM1650 runs on Windows NT in addition to HP workstations and others. The FDM1650 sells in the $100,000 price range.

Stratasys 8000, available in the fourth quarter of 1996, will have a modeling envelope of 508x432x610 mm. (20x17x24 in.). The large capacity of the Stratasys 8000, coupled with speeds of six times faster than today's FDM process, allows for fast, accurate prototypes, patterns, and masters in several material choices. The system will be priced in the $300,000 range.

Contact Stratasys, Inc., phone: (612) 937-3000, fax: (612) 937-0070, e-mail: fdm@stratasys.com.

Personal Information Manager

Pacific Software Group has announced Version 1.6 of its TaskManager and TaskManager Pro personal information managers for UNIX. These products are designed to provide an intuitive, visual interface for character-based terminals.

TaskManager provides officewide e-mail and messaging facilities as well as a due date tracking and reminder system for alerting users to upcoming events and deadlines. TaskManager also enables users to build attractive, easy-to-use menus to launch programs and execute system commands. Menus can be configured by user, by department, or can be systemwide. Special configuration options can restrict user access to sensitive functions.

TaskManager "QuickMail" provides an easy-to-understand visual interface for reading, sending, sorting, and printing e-mail. TaskManager also includes an appointment and reminder scheduler, prioritized to-do lists, and address books.

Contact Pacific Software Group, phone: (800) 949-4490 or (310) 472-5168, fax: (310) 839-8620.

System Administration

FSA Corporation has announced PowerBroker 2.1. With a new GUI and new supported architectures, PowerBroker provides privilege management for controlling the root account on UNIX systems and a comprehensive indelible audit trail of root actions for uncompromising security.

Using PowerBroker, system administrators can assign specific system management duties such as resetting forgotten passwords, restarting a printer, or backing up files to other users. PowerBroker can accept requests from users to run specified programs in important accounts such as root. Administrative privileges can be selectively granted to specified users under circumstances outlined by using a policy language or GUI.

PowerBroker selectively logs root activity and can record entire sessions for later replay. It can monitor sessions in real time. PowerBroker's network traffic can be encrypted.

PowerBroker is supported on HP-UX and other UNIX platforms and is priced at $9,000 for a 30-host license.

Contact FSA Corporation, phone: (403) 264-4822, fax: (403) 264-0873, e-mail: sales@fsa.ca, http://www.fsa.ca.

PC-to-UNIX Connectivity

Century Software has announced Version 3.2 of its TinyTERM Series for Microsoft Windows 95 and Windows 3.1. TinyTERM provides several easy, reliable, and inexpensive solutions for office networking, whether the user needs to print from a UNIX host, store PC files on UNIX hosts, or access the Internet for the latest stock quote via a single-click ICONect. The TinyTERM Series

of products includes TinyTERM, TinyTERM Plus, TinyTERM+NFS, and TinyTERM Pro.

All TinyTERM series product line components, such as TCP/IP, NFS, and FTP, are natively written as 32-bit applications. The components follow standard conventions and take full advantage of the Windows 95 enhanced user interface. The products feature a PPP dialer, an NFS client, an FTP client, LPR/LPD Printer Sharing, and an easy, single-step installation.

Prices range from $79 per user to $259 per user. Single-user licenses of TinyTERM+NFS and TinyTERM Pro are also available.

Contact Century Software, phone: (800) 877-3088 or (801) 268-3088, fax: (801) 268-2772, e-mail: sales@censoft.com.

Disk Declassification

Los Altos Technology, Inc. has announced the Version 3 of its UniShred Pro for SCSI disk declassification. UniShred Pro implements U.S. Government approved methods to non-destructively remove classified, confidential, or sensitive computer information from UNIX workstation disks. UniShred Pro removes classified information from SCSI disks, overwriting all addressable areas, as well as defect areas. All UNIX boot files, super blocks, swap space, file system partitions, and alternate cylinders are overwritten to prevent classified information from being accessed by unauthorized personnel.

UniShred Pro prints a report describing the disk, the overwrite operations performed, and any errors encountered. It overwrites the disk in any of several patterns specified by government regulations, or in any custom pattern specified by the user. A fast emergency overwrite mode is available. Version 3 also gives a verification-only pass to ensure the disk was successfully overwritten.

UniShred Pro comes with a powerful yet easy-to-use user interface, which is implemented across all supported platforms (including HP-UX).

Contact Los Altos Technologies, phone: (800) 999-UNIX or (408) 973-7700, fax: (408) 973-7707, e-mail: info@lat.com.

High-Availability Products

Qualix Systems Group (a division of Qualix Group, Inc.) has announced the QualixHA Solutions product line. The QualixHA Solutions suite provides comprehensive and integrated monitoring, restart, failover, and recovery capabilities. QualixHA Solutions support a range of RDBMS and networking environments, integrate with a variety of RAID products, and run on UNIX platforms from HP and others.

Components of the QualixHA Solutions line include VERITAS FirstWatch, Qualix HA-Environment, and Qualix HA-Modules software.

FirstWatch, the base HA failover engine, maintains heartbeat communications between servers via private networks and through disks. It removes any single point of failure.

Qualix HA-Environment simplifies the installation and expands the HA support to a range of volume managers, file systems, and RAID products. It integrates seamlessly with various network protocols.

Optional software components provide high availability support for specific applications and/or software subsystems.

Prices for the complete HA solutions range from $8,000 to $95,000, depending on configurations and options.

Contact Qualix Group, phone: (415) 572-0200, fax: (415) 572-1300, e-mail: info@qualix.com, http://www.qualix.com.

Web Data Management

Empress Software Inc. has announced EMPRESS DataWEB, an application development environment designed for Hypermedia Web Data management. EMPRESS DataWEB allows users to easily and rapidly build Web-based applications using the efficient and secure data storage and management capabilities of the EMPRESS RDBMS.

Empress can easily store and manipulate multimedia data types. Applications built using EMPRESS DataWEB can be used as a public Internet application or an enterprise intranet application.

At the core of EMPRESS DataWEB resides EMPRESS Hypermedia, the Empress Web HTML Toolkit. Applications built using Empress Hypermedia can dynamically transfer data from an EMPRESS database into hypertext templates, or transfer them as binary objects to multimedia and hypermedia applications. Web data and binary objects can also be returned back to the database directly from the application.

Contact Empress Software, phone: (301) 220-1919, fax: (301) 220-1997, http://www.empress.com/.

EtherLite Port Server

Central Data Corporation has introduced the new *EtherLite* Port Server, designed to make it easier to add serial ports to TCP/IP networks. The *EtherLite* Port Server blends the control and performance of local serial ports with the convenience of an Ethernet 10Base-T connection. The product is shipping on Windows NT, HP-UX, and other open platforms.

The *EtherLite* Port Server provides real serial ports, so ports are not weighted down by telnet and rlogin protocols. The result is a much easier configuration, less Ethernet congestion, and a much lower cost per port when compared to other Ethernet solutions, the company notes. The EL-16 *EtherLite* Port Server connects 16 asynchronous RJ-45 serial ports to an Ethernet TCP/IP network. All ports will transfer simultaneously at 115 K baud. Surge protection is provided on all serial lines.

The Port Server contains FLASH EPROMs for fast and easy firmware upgrades in the field. The list price for the EL-16 is $1,395.

Contact Central Data, phone: (217) 359-8010.

Network Terminals

ARGOS SYSTEMES has announced Spotline asynchronous and network terminals. The terminals operate as workstations in multi-user systems such as UNIX or directly on Ethernet TCP/IP or token-ring networks. The new products offer color display, performance, open-ended design, intelligence, standardization, and integration.

Display time is shortened through high-speed links with servers: 115,200 bauds in asynchronous mode, 10 Mbits in a network configuration. Multiple-session capabilities enable each terminal to connect to several servers simultaneously.

The company's newest product, the Spotline 210, offers powerful network workstation capabilities with the addition of a VGA color monitor and a 102-key keyboard. The unit provides for eight simultaneous Telnet sessions and has two RS-232 links, a parallel port, and a versatile print server. A simple setup utility lets users easily configure the machine. ANSI emulation is provided for SCO, AIX, HP-UX, and UNIX System V.

Contact SPOTLINE INC., phone: (415) 583-9605, fax: (415) 583-9608.

Open Systems Security

Memco Software has announced SeOS Version 1.4, featuring the Security Policy Model Database (PMDB) and the Security Wizard for quickly defining and enforcing security policies across large, multi-platform UNIX networks and applications.

Predefined templates and a GUI enable users to easily tailor security policies. The PMDB distributes the security policies throughout large UNIX networks, quickly and effectively enforcing security across multi-platform UNIX environments.

Version 1.4's central administration functions enable administrators to deploy and manage a distributed security architecture from a central location. Integration with products from PLATINUM technology, CyberSAFE Corporation, Tivoli Systems, and New Dimension Software allow the integration of security with overall systems management.

Memco's SeOS Access Control is currently available for HP-UX and other operating systems. Pricing begins at $1,000 per machine. SeOS Security Administration pricing begins at $5,000.

Contact Memco Software, phone: (800) 862-2602 or (212) 286-8820, fax: (800) 862-2604, http://www.memco.com.

Workstation Memory

Kingston Technology has announced price decreases on its workstation memory for HP 9000s and other workstations. This price decrease is as substantial as 20 percent on some memory products, the company notes.

All Kingston memory is backed by a lifetime warranty with a 24-hour product replacement policy. All memory is 100-percent tested and guaranteed fully

compatible with the system, diagnostics, and software for which it is designed.

Kingston markets its products through a worldwide network of distributors, major reseller chains, and independent dealers. Kingston is ISO 9001 certified.

Contact Kingston's Workstation Sales Division, phone: (800) 835-2545 or (714) 435-2600, http://www.kingston.com.

New from PLATINUM

HP Premier Partner Status

PLATINUM technology, inc. has announced that the PLATINUM AutoSys job scheduling tool and the PLATINUM DBVision performance management tool now can integrate with IT/Operations. PLATINUM is now an HP Premier Partner through the HP OpenView Partner Program. IT/Operations is HP's fundamental component of the HP OpenView Solution Framework. PLATINUM's integration allows users to manage their environment from a single point—the IT/Operations console.

PLATINUM AutoSys centralizes and automates the scheduling and management of jobs in distributed environments and provides mainframe batch scheduling features.

The PLATINUM DBVision performance management product provides 24-hours-a-day, 7-days-a-week monitoring of performance metrics for relational database management systems in distributed UNIX environments.

Java Code Generation

PLATINUM technology, inc. has announced that PLATINUM Paradigm Plus, an object-oriented analysis and design tool that supports Enterprise Component Modeling (ECM), reverse engineering, and code generation, now generates Java class definitions with its attributes and member functions. This is then compiled in a Java environment. Additionally, Paradigm Plus designs which have been developed for deployment in other environments such as C++ can be re-deployed as Java applications simply by generating Java class definitions.

The Paradigm Plus object-oriented analysis and design tool supports Enterprise Component Modeling, a technique for companies to define, organize, and manage increasingly complex enterprise-wide software systems. Paradigm Plus generates code in C, C++, Ada, Smalltalk, PowerBuilder, Forte, and Java, as well as RDBMS and ODBMS schema definitions. It can also reverse engineer C, C++, Smalltalk, and SQL code. Paradigm Plus 3.0 for Microsoft Windows starts at $4,000 and on UNIX platforms beginning at $7,700.

Contact PLATINUM technology, phone: (800) 442-6861 or (708) 620-5000, e-mail: info@platinum. com.

New from Central Design Systems

License Management and Tracking

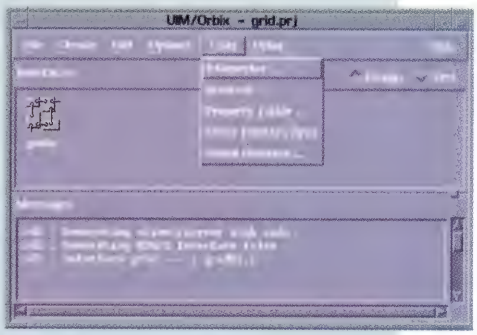
Central Design Systems, Inc. (CDSI) has announced LicenseTrack 4.0 for managing software licenses across the enterprise. LicenseTrack enables IS managers and system administrators to quickly evaluate software usage trends and status and improve decision making for the cost-effective purchase of additional software licenses, maintenance, and administration. LicenseTrack runs on DOS, Windows (3x, 95, NT), and all major UNIX operating systems.

LicenseTrack 4.0 features new functionality to manage Java applets; a GUI-based console for managing FLEXlm daemons; the ability to set SNMP traps that integrate with network management tools; and significantly enhanced

Visual CORBA 2.0 Development

Black & White Software has announced the newest version of the UIM/Orbix distributed graphical application builder. UIM/Orbix 2.0 is the latest result of a strategic partnership entered into by Black & White and IONA Technologies in 1994. The software includes enhanced graphical tools for constructing clients and servers, automatically integrates GUI and three-tiered distribution-based code, offers IDL development and CORBA 2.0 conformant features, and facilitates the administration of deployed applications across a network. The blending of graphical presentation with standards-based distributed software objects is intended to yield a development framework that is easy to use, allowing programmers to quickly get started with CORBA 2.0.

Black & White Software UIM/Orbix



UIM/Orbix is an expert integration of UIM/X—the GUI builder from Visual Edge Software, Ltd.—and IONA's Orbix, the industry-leading implementation of the Object Management Group's Common Object Request Broker Architecture (CORBA).

Contact Black & White Software, phone: (408) 369-7400, fax: (408) 369-7406, e-mail: info@blackwhite.com, http://www.blackwhite.com.

reporting capabilities. Pricing starts at $995 for PC® Servers and $4,995 for UNIX systems.

Network License Toolkit

Central Design Systems, Inc. has announced LicenseSERV, a floating license toolkit for PC and UNIX applications. Currently shipping, LicenseSERV provides flexible and easy-to-implement network licensing for application developers and system administrators.

LicenseSERV supports applications developed for cross-platform deployment and is LS-API compliant to assure application compatibility. LicenseSERV operates over networks that use either TCP/IP or IPX/SPX.

LicenseSERV supports all major UNIX platforms, Windows (3.1, NT, and 95), DOS, Macintosh, NLM, and VMS. Pricing starts at $2,500 for PC operating systems, $5,000 for the Standard Edition, and $7,500 for the Extended Edition.

Contact Central Design Systems, phone: (800) 366-2347 or (408) 327-9800, fax: (408) 327-9810, e-mail: info@cdsi.com.

Charting Tools

Soft-tek International, Inc. has announced GRAFSMAN/WWW Tools for NT and UNIX. GRAFSMAN/WWW is an add-on toolset for the GRAFSMAN charting package. It provides direct output of charts and graphs as .GIF files appropriate for viewing on the World Wide Web. Each .GIF image can also have an associated image map to seamlessly add "hot-spot" point-and-click interactivity to live graphs in Web applications. Application developers can display their information on the Web in a graphical format. With the image map, users can point-and-click on the graph to drill down on the data being presented.

Each click on an image map bar or pie segment can have the underlying application take further action, like showing what data made up that bar.

GRAFSMAN is available for Windows, NT, UNIX, and other platforms.

GRAFSMAN with the WWW tools is priced at $395 for NT and $1,995 for a UNIX server.

Contact Soft-tek, phone: (316) 838-7200, fax: (316) 838-3789, e-mail: sales@soft-tek.com, http://www.soft-tek.com.

Automated Problem Detection

Heroix Corporation has announced that its RoboMon problem detection and correction software now supports HP-UX 10. RoboMon now provides full client-server capability.

RoboMon users can modify problem sensors on a remote node from their local machine. In addition, users can supplement RoboMon's supplied problem sensors with their own, and manage them as well as the provided sensors, via the same GUI. The installation procedure has been streamlined, additional browsable documentation is available online, and a number of performance enhancements have been incorporated into the product.

RoboMon uses a "rule-based" approach, which detects and corrects system and operational problems before they interrupt system reliability and performance. RoboMon UNIX works on problems associated with system operations and performance, processes, applications, users, disks, files, file systems, and networks. It can automatically take corrective actions or notify personnel based on thou-

sands of statistics. RoboMon provides built-in problem sensors for "out of the box" operation, as well as unlimited monitoring and correction via user-defined sensors. The software automatically adapts to site-specific software and hardware configurations. RoboMon prices range from $300 to $2,500. It runs on HP-UX and other open platforms.

Contact Heroix, phone: (800) 229-6500, e-mail: rlane@heroix.com http://www.RoboMon.com.

Data Manipulation Tool

Taurus Software has introduced Warehouse, an easy way to migrate data without programming. Warehouse selects and migrates data across HP MPE, VAX/VMS, and UNIX platforms straight into new databases, where it arrives as native data. By extracting legacy data from proprietary structures and moving it to more flexible relational databases, clients can speed up migrations, build decision support systems, and create test environments.

Warehouse addresses issues such as how to manipulate data as it is moving over, how much data to migrate, and how to deal with not having the disk space to extract data into a flat file, convert it, move it across a network, and then load it into a relational database.

It converts data types, opens up different databases on different computers at the same time for reading and writing, and allows extensive massaging of data as it is being moved.

The new Warehouse version also allows retrieval of archives across platforms. Users can archive from IMAGE on a 3000 and retrieve it directly into Oracle on a 9000.

Warehouse supports IMAGE, ALLBASE, Oracle, Codasyl DBMS, flat, and text files. The product was originally developed for the HP environment.

Contact Taurus Software, phone: (415) 961-1323, fax: (415) 961-1454.

Distributed Application Management

Nat Systems International, Inc. and Novadigm, Inc. have announced an alliance to integrate Nat Systems' NatStar development environment with Novadigm's distributed software management environment, the Enterprise Desktop Manager (EDM). Under the terms of the agreement, the companies will work together to develop an "EDM Adapter" that will allow NatStar developers to automatically deploy applications and to synchronize version changes as they are distributed to desktops and servers across the enterprise.

The Adapter will be available with the next major release of NatStar by the third quarter of 1996. The Nat Systems/Novadigm product runs on Windows NT, HP-UX, and other platforms.

NatStar is an adaptable and integrated development environment for building and delivering enterprise client-server applications and integrates with best-of-class tools for application design, testing, tuning, and distribution. It supports multiple development methods.

Contact Nat Systems, phone: (703) 760-0900, fax: (703) 760-9810, http://www.natsys.com.

Manufacturing Software

Tangible Vision, Inc. has announced Version 1.5 of its object-oriented, GUI-based, client-server manufacturing software product, Imprimis.

Product and process manufacturing details, captured in the customer part file, enable companies to easily qualify for ISO 9000 certification. Routings with subcontracting capabilities

Code Generation

Imperial Software Technology has announced XD/Java and JavaDesigner. XD/Java is a Java code generation option for X-Designer. XD/Java provides Java code-generation capabilities for the X-Designer GUI builder for Motif and Microsoft Windows. Motif interfaces that were not produced using X-Designer can be moved to Java using XD/Java.

JavaDesigner is a full-function Visual Java application builder that provides an integrated GUI builder, Class Browser, and property editors. Knowledge of Java classes is built into JavaDesigner, but users can also extend this knowledge by scanning additional Java classes.

JavaDesigner integrates with the major Java development environments, including SunSoft's Java WorkShop. It will be available on HP-UX and other UNIX platforms and on Windows and Macintosh.

X-Designer, with XD/Java, is priced at $3,500 for the first license, including the first year's maintenance and upgrades. JavaDesigner pricing is not yet available but will include the first year's maintenance and upgrades.

Contact IST, phone: (415) 688-0200, fax: (415) 688-1054, e-mail: sales@ist.co.uk, http://www.ist.co.uk.

Imperial Software Technology X-Designer

automatically generate vendor purchase orders and also enable scheduling of subcontracted operations. In addition, routings for multifacility operations allow a single job to be seamlessly scheduled and tracked across two or more facilities.

Imprimis is an Enterprise Resource Planning/Manufacturing Execution System (ERP/MES) that supports multicountry, multifacility, multicurrency, and multilanguage environments, and addresses Make-to-Stock, Make-to-Order, and Engineer and Make-to-Order manufacturing operations. Imprimis provides management with timely information and the visibility to make key decisions.

Imprimis runs on HP 9000s and other platforms.

Contact Tangible Vision, phone: (708) 969-7517, fax: (708) 969-7523.

Traffic Reporting System

Securicor Telesciences, Inc. has announced Release 3.0 of the AUTRAX 5000 Traffic Analysis and Maintenance System. Release 3.0 supports X-Windows, OSF/Motif GUI, X.25 communications, and TCP/IP and NFS protocols.

New reporting features include CCITT E.500 busy hour reporting (TE 500 standard, digital switch optional), graphical reporting (XRT/Graph), user-modifiable ICUP reports for electromechanical switches, and a GUI database browser and report writer.

The AUTRAX 5000 system supports dial-up, dedicated, and private networks and is designed to meet the requirements of both small and large switching networks, including digital, stored program controlled, and electromechanical switches. A typical AUTRAX 5000 Release 3.0 system configuration consists of the AUTRAX 5000 host, one or more high-performance color workstations, X terminals, and laser printers.

The AUTRAX 5000 graphical report tool allows the user to create line, bar, and pie charts from the collected traffic data. Graphs can be generated using data files created with any text file program and then stored or displayed on an X terminal or printed to a laser printer.

Contact Securicor Telesciences, phone: (609) 866-1000, ext. 838, fax: (609) 866-0185.

Object-Oriented Courses

ObjectSpace, Inc. has announced a new object-oriented analysis and design course based on the Unified Method. This course is one of the first being offered in the world that centers around the Unified Method. ObjectSpace also announced a course on Java.

The Unified Method course takes three days and emphasizes practical, hands-on application of the method through intensive practice with case

studies. It is currently available from ObjectSpace.

The class can benefit those companies just getting started with object technology that want to adopt this emerging industry standard and companies wanting to transition from OMT or Booch to the Unified Method. The Unified Method was created by Dr. James Rumbaugh and Grady Booch, the developers of the OMT and Booch methods. It emphasizes a standard notation and includes steps and artifacts widely used and found to be of practical value.

The three-day Java class, introducing students to every main Java feature, uses a commercially oriented electronic store application that involves networking communications, graphics, dynamic class loading, and audio. The class is open to all programmers with three months of experience in any object-oriented programming language.

Contact ObjectSpace, phone: (214) 934-2496, fax: (214) 663-9099, e-mail: training@objectspace.com, http://www.objectspace.com.

Database Backup Management

SOFTWARE PARTNERS/32, INC. and DataTools, Inc. have announced the integration of StorageCenter, a storage management suite for UNIX, with SQL-BackTrack, a comprehensive Oracle and Sybase backup and recovery tool. StorageCenter and SQL-BackTrack can be used to back up live databases and perform incremental and object-level backups of large database files.

StorageCenter contains applications for backup and restore, media management, archiving, and administration. It can manage a virtually unlimited number of CPUs and storage devices as a single "storage domain." Multisite parallel backups, saveset copying for off-site vaulting, automated media cycling, redundancy features, and RSA encryption are provided. Optional support is available for robotic tape libraries and large silos.

SQL-BackTrack provides database-aware backup and recovery for Oracle and Sybase databases. SQL-BackTrack enables fast, online backups, incremental backups, and object level backups for large database files.

The StorageCenter Enterprise version is priced starting at $6,250. The Workgroup version is priced starting at $1,875. StorageCenter supports HP-UX and other UNIX systems. SQL-BackTrack is available for both Oracle and Sybase starting at $4,595 per server.

Contact SOFTWARE PARTNERS/32, phone: (508) 887-6409, fax: (508) 887-3680, e-mail: info@softwarepartners.com, http://www.softwarepartners.com.

Attention vendors: New product announcements should be sent to New Products Editor, hp-ux/usr *magazine, Interex, P.O. Box 3439, Sunnyvale, California 94088-3439, USA, or e-mail: pollace@interex.org.*

Deadline for submission is two months prior to publication.

New Products refers to numerous products by their trade names. In most cases, these designations are claimed as trademarks or registered trademarks by their companies.

Sign up NOW for Spring 1997 Listings

hp-ux/resource directory

The *hp-ux/resource directory* is a complete resource guide for HP-UX users seeking answers. This is one of the industry's most extensive reference guides for HP-UX products, services, and vendors. It will be devoted entirely to HP 9000 users operating in multi-user, workstation, and multi-system UNIX environments. This bi-annual directory, published each year in March and September, is a separate publication mailed out with *hp-ux/usr* magazine, the only HP-specific publication on the market.

Each company is listed by category, with each listing including company name, product, operating environment, and phone number. The cost for a full year listing in the *hp-ux/resource directory* is $475. Discounts are available for current advertisers in *hp-ux/usr*, *Interact* or the *Vendor Service Source Directory*. Advertisers who run more than one listing per issue also receive a discount. There is a 75-word maximum per listing, with a charge of $1.00 per word over the maximum.

Product Categories

Accounting
Accounting Software
Alphanumeric Paging Software
Application Development Software
Application Development Tools
Application Development Tools/4GL
Application Software Design
Backup Software
Bar Code Data Collection Systems
Batch Job Management
Books
Business Software
CD-R
CAD Software/Hardware
Case Tools
Change Management for Software Development
Change Management Tools
Client-Server
Communications
Communications Servers
Communications Software
Consulting
Consulting/Systems Integration
Customer Support/Help Desk Systems
Database Management Systems
Database Management Tools
Data Center Management
Data Warehousing
Decision Support Systems
Desktop Publishing
Diagramming and Flowcharting
Disaster Recovery
Distributed Computing
Distribution Resource Planning
Distribution Software
Document Management
Electronic Data Interchange (EDI)
Electronic Form Printing
Electronic Mail
E-Mail and Directory Integration
End-User Computing
Executive Information Systems
Facility Maintenance Software
Fax Automation
Financial
Forestry
Fourth Generation Language
GIS (Geographic Information System) Government and Utility Software
Graphics
Hardware
Hardware/Mass Storage
Hardware Subsystems
Help Desk Management
Human Resources and Personnel Systems
Image Processing
Image Storage and Retrieval Management
Input Devices
Industrial Terminals
Instrument Control
Integration Tools
Inventory Control
I/O Boards
Job Scheduling and Workload Management
Laser Printers
Laser Printing Software
Maintenance
Manufacturing
Manufacturing Software
Mass Storage
Mass Storage Peripherals
Memory
Memory Upgrades
Migration Services
Migration Tools
Modular Mass Storage
Multimedia
Network Backup Software
Networking
Networking Systems
Network Management
Operating System
Payroll
PC Compatibility
PC Integration
Performance
Performance Software
Personal Information Manager
Personnel Management
Pointing Devices
Power Protection and Conditioning
Print Management
Process Control Software
Production Planning
Project Management
Programmer's Editor
Protocol Converters/Interfaces-Hardware
Publications
Purchase Order Management
Quality Assurance Tools
Records Management
Rentals
Report Viewing, Printing, and Distribution
Report Writers
Sales and Marketing
Scheduling
Scheduling/Task Management
Security
Software
Software Development Tools
Software Distribution Tools
Software Maintenance and Testing
Spoolers
Spreadsheets
Statistics/Data Analysis
System Integration
System Management
System Management Tools
System Printers
3D Graphics Tool Kit
3D Porting Tool
Tape Backup Products
Tape Storage/Data Interchange
Technical Documentation/Cross Referencing
Telephone Management
Terminals
Terminal Emulation
Text Editors
Time and Billing
Time Reporting Terminals
Training
User Groups
Video/Keyboard/Mouse Extension
Warehouse & Distribution Management
Workstations

Other categories may be created as needed.

interex
Shared Knowledge. Shared Power.

hp-ux/resource directory

Spring 1997 Listing Form

	FIRST LISTING	EACH LISTING THEREAFTER	TOTAL
☐ Listing (includes two issues)	$475[1]	$375[2]	$_____
☐ Hyperlink to your home page[6]	$500	$150	$_____
☐ Company or Product Logo[3]	$100	$ 50[2]	$_____
☐ Product Photo[4]	$100	$ 50[2]	$_____
☐ Cross Reference[5]	$200	$200[2]	$_____

Total $_____

[1] *For current vendors who advertise at least 6 times a year in* hp-ux/usr, Interact, *the cost is $425.*

[2] *For current vendors who place more than one listing or who have a listing(s) in the* Vendor Service Source *directory.*

[3] *Maximum size that logo will appear is 3/4 inches high by 1-1/2 wide.*

[4] *There is a $75 charge for changing photos between issues. Photos must be submitted in either 35mm slides, 4x5 transparencies, or up to 4x6* ***Glossy*** *prints (black and white or color). The actual size of the photo in the publication will be 2-3/16" wide. The height will be determined by the orientation of the original photo (horizontal or vertical).*

[5] *A single listing can be placed in multiple categories for an additional charge of $200 per category.*

[6] *In addition to the listing in the magazine*

Deadline: Monday, December 2nd, 1996

(Please fill in all information completely—**ONLY typed or legibly printed copy will be accepted**.)

Category _____

Product Name _____

Operating Environment _____

Product Description (MAXIMUM 75 WORDS) There is a $1.00 per word charge for all listings over 75 words. Please type copy on a separate sheet and attach to this form.

Company Name _____

Address _____

City _____ State _____

Zip/Postal Code _____ Country _____

Telephone _____ Fax _____

Authorization:

Signature _____ Print Name _____

Title _____ Date _____

Please mail or fax completed form to: Interex, 1192 Borregas Avenue, Sunnyvale, CA 94088, U.S.A., Attention: Kathie Schwartz, Interex Advertising Department, 800.468.3739, Ext. 620, 408.747.0227,
Fax 408.747.0947

PAYMENT OR PURCHASE ORDER MUST ACCOMPANY ALL ORDERS

Terms & Condition of Sale: All ads are under the terms Net 30 Days. Any balance over 30 days old will be charged 1.5% per month. Interex reserves the right to refuse advertisement from any delinquent advertisers. **Cancellations Clause:** All cancellations must be made by the listing due date and must be followed in writing within 5 working days.

interex

Shared Knowledge. Shared Power.

Membership Levels *and Service Package*

The International Association of Hewlett-Packard Computing Professionals

Membership Levels

- **associate level** includes the following services/benefits:
  - **Subscription to either:**
    hp•ux/usr magazine - includes companion Product Directory
    Interact magazine - includes companion Product Directory
  - Member rates for Interex Conferences
  - Read-only access to Interex Online library
  - Membership in your local Regional User Group (RUG) at RUG membership rate

- **contributing level** includes the following services/benefits:
  - **Subscription to BOTH:**
    hp•ux/usr magazine - includes companion Product Directory
    Interact magazine - includes companion Product Directory
  - Subscription to *InterexPress,* monthly news publication
  - E-Mail account through Interex (includes read-only access to Interex Online library)
  - Access to Special Interest Groups (SIGs)
  - Member rates for Interex Conferences
  - Membership in your Regional User Group (RUG) at RUG membership rate
  - Voting Privileges for Board Elections and Advocacy Surveys
    (i.e., system improvement surveys)

Service Package

- **online service package** includes ALL the benefits of Contributing Level plus:
  - **Software Access**—unlimited downloads from entire library of HP-UX, MPE, and RTE programs (containing over 4,800 programs). Includes one free tape of current Interex Annual Release in the operating system of your choice. Custom tapes from software library are also available.
  - **Information Access**—full text search and downloading capabilities for all Interex publications including: *hp-ux/usr, Interact,* Vendor Resource Directories, product news and announcements, and Conference Proceedings abstracts.
  - **Member Access**—member directory. Find members with similar interests. Plus access to the *Who's Who* guide of Interex staff, volunteers, and HP liaisons.

Online services are continually upgraded and modified; services are subject to change without notice.

I'd Like to Join Interex

Order Form

Choose one of the following

membership levels & service package

- ☐ Associate Level, $49.50*
- ☐ Contributing Level, $115.00*
- ☐ Contributing Level Plus Online Package $595.00*

All membership and service packages are based on an annual fee.

Package subscribers, please choose the following:

preferred software format and operating system for the annual tape release

- ☐ 1600 BPI Magnetic Tape
- ☐ 6250 Magnetic Tape
- ☐ Linus Cartridge Tape (CS-80)
- ☐ DAT 4mm

(Check one of the following)

☐ HP-UX ☐ MPE/iX ☐ MPE V ☐ RTE

Please read and sign the following disclaimer: I am applying for services with Interex. I understand that no funds will be returned after any Contributed Software Library (CSL) tapes/disks have been shipped or downloaded from Interex. I agree not to distribute software to any unauthorized users or use software received through Interex on more than one system at a time. I understand that this agreement stays in force even after my services expire or are terminated.

Contact the Membership Department for pricing of the Right-to-Copy License for multiple machine usage

Signature _____

Date ____/____/____

member directory

Please include me in the member directory.

☐ Yes ☐ No Please initial:_____

service agreement

If you relocate, should services transfer with you?

☐ Yes ☐ No Please initial:_____

mailing list

Would you like to receive mailings about other computer-related vendors' products and services? ☐ Yes ☐ No

mailing address

(attach business card here)

_____ name

_____ job title

_____ company

_____ address

_____ city/state/zip

_____ country

_____ telephone/extension

_____ fax

_____ e-mail

billing address (if different from mailing address)

_____ name

_____ company

_____ address

_____ city/state/zip

_____ country

payment options

☐ Bill me ☐ Check enclosed, payable to Interex

☐ Purchase order enclosed, PO#_____

(purchase order accepted for invoicing purposes only)

☐ Please charge my: ☐ Visa ☐ MasterCard ☐ AmEx

_____ credit card number / expiration date

_____ signature

Total payment enclosed $ _____

Foreign currency accepted BUT payment must be equivalent of U.S. currency. Each publication has an annual subscription value of $49.50.

NOTE: Services do not begin until payment is received.

*Canada & Mexico add $25 and all other countries outside the U.S. add $50 for additional postage.

send form and payment to:

Interex, P.O. Box 3439,
Sunnyvale, CA 94088-3439, USA;
fax 408 747-0947
phone: 800.INTEREX, 408.747.0227, **fax**: 408.747.0947
e-mail: membership@interex.org
CompuServe: 76376, 1222
World Wide Web: http://www:interex.org

Advertiser's Index

Please call or fill out adjacent card for further product information.

READER SERVICE NUMBER	ADVERTISER	PAGE #
115	**Bering Technologies, Inc.** (800) 237-4641 or (408) 365-6500	35
30	**Camintonn/Z-Ram** (800) 368-4726 or (714) 454-1500	C-2
6	**CLAM Associates** (617) 621-2542 or e-mail: marketing@clam.com	33
110,111	**Computer Solutions.** (407) 649-0123/Fax (407) 649-1407	29,59
113	**Concorde Technologies** (800) 359-0282/Fax: (619) 536-5500	7
9	**Confluent** (800) 780-2838	85
119	**Consan** (612) 949-0053 or (612) 949-0453	C-4
140	**C.S.U. Industries, Inc.** (516) 239-4310/Fax: (516) 239-8374	81
76	**Dallastone** (603) 647-8168/Fax: (603) 624-2466	51
164	**Design 3000 Plus, Inc.** (503) 585-0512/ Fax: (503) 585-1706	49
56	**GE Capital** (800) GE-RENTS	75
8	**Herstal Automation** (941) 358-2001/Fax: (941) 358-2010	63
	Hewlett-Packard (800) HP-KNOWS	2,3
11	**HiComp** (800) 323-8863	39
17	**IEM, Inc.** (970) 221-3005 or (800) 321-4671/ or /e-mail: info@iem.com	77
133	**Interphase** (800) FASTNET	C-3
171	**I/O Data Systems, Inc.** (216) 835-2211/Fax: (216) 835-0220	51
117	**ITAC Systems, Inc. – Mouse-Trak** (214) 494-3073/Fax: (214) 494-4159	5
61	**LBM** (800) 898-6434 or (203) 966-0661	83
139	**Micom** (310) 802-2345	89
130	**Midcom Communications, Inc.** (800) 643-2664	91
7	**Monterey Bay Communications** (408) 429-6144/Fax: (408) 429-1918	1

READER SERVICE NUMBER	ADVERTISER	PAGE #
135	**NSD** (800) 538-3818	11
122	**ORBIT Software** (800) 6-Online or (510) 837-4143	53
86	**Perfect Software Solutions, Inc.** (800) 741-99HP or (516) 741-1210	79
97	**Pericom, Inc.** (609) 588-5300/Fax: (609) 588-8906	27
91	**Personal Productivity Tools** (708) 620-5000/Fax: (708) 691-0718	41
100	**Robelle Consulting Ltd.** (604) 582-1700/Fax: (604) 582-1799	19
126	**Sejus Corporation** (503) 638-9000/Fax: (503) 638-9009	73
81	**Softlinx** (800) 899-7724	39
180	**Software Licensing Corp.** (702) 832-0881	41
104	**Software Moguls, Inc.** (612) 932-6738/Fax: (612) 932-6736	59
103	**Straightline** (206) 865-8314	14,15
134	**Taurus Software** (415) 961-1323, ext. 100	17
77	**Technical & Scientific Application** (800) 422-4872/Fax: (713) 935-1555	43
49	**Ted Dasher & Associates** (800) 638-4833/Fax: (205) 591-1108	69
42	**Tower Concepts, Inc.** (315) 724-3540	61
162	**Tracer Technologies, Inc.** (800) 319-7348	49
137	**Unisolutions** (714) 488-3960	87
40	**VESOFT, Inc.** (310) 282-0420/ Fax: (310) 785-9566	47
183	**Vital Soft, Inc.** (408) 745-7680/ Fax: (408) 745-6681	9
145	**Workstation Direct** (888) 610-1600	57
128	**World Data Products** (800) 553-0592/Fax: (612) 943-1131	29

INTERPHASE CORPORATION®

Performance I/O Products for Hewlett-Packard Servers and Workstations

Powerful networking and mass storage connectivity for the world's leading line of UNIX-based workstations and servers!

Interphase provides performance I/O products for HP systems as both an OEM supplier to Hewlett-Packard and as an authorized HP Channel Partner. Interphase products for HP platforms are available worldwide through a network of distributors, value added resellers and HP LPO organizations. Our product line includes:

ATM (Asynchronous Transfer Mode)
5215 VME ATM Adapter — ATM connectivity for VME-based HP workstations and servers running HP-RT.
4815 EISA ATM Adapter — ATM connectivity for EISA-based HP platforms running HP-UX .

FDDI (Fiber Distributed Data Interface)
5211 VME FDDI Adapter — FDDI connectivity for VME-based system running both HP-UX and HP-RT.
4811 EISA FDDI Adapter — FDDI connectivity for EISA platforms running HP-UX.
FDDI Concentrators — One of the industry's broadest lines of FDDI concentrators ranging from inexpensive desktop models through fully-redundant backbone workhorses.

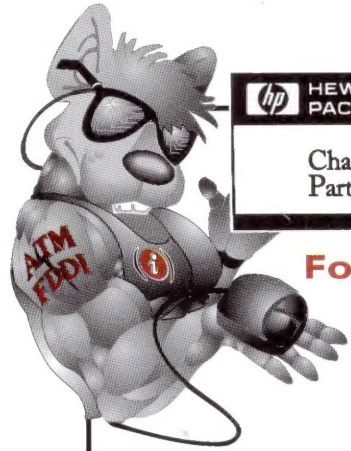
10Base-T "Ethernet"
4221 VME Ethernet Adapter — Provides four 10Base-T ports from a single slot and includes driver support for HP-RT.

100VG-AnyLAN
5022 HP-PB AnyLAN Adapter — IEEE 802.12 network connectivity for Series 800 systems running HP-UX.
4622 SBus AnyLAN Adapter — Provides 100VG-AnyLAN connectivity for Sun SBus systems running Solaris.

100Base-T "Fast Ethernet"
4824 EISA 100Base-T Adapter — Brings Fast Ethernet technology to HP 9000 servers and workstations running HP-UX.

SCSI-2
4220 VME SCSI-2 Adapter — Provides mass storage connectivity to HP systems operating in HP-RT environments.

Fibre Channel
5526 PCI Fibre Channel Adapter — Utilizes the HP Tachyon™ Fibre Channel engine and the Interphase *(i)chipTPI™* TSI-to-PCI ASIC to provide high performance Fibre Channel connectivity for PCI-based platforms.



HEWLETT PACKARD
Channel Partner

For more information :

1-800-FASTNET

fastnet@iphase.com

http://www.iphase.com

CIRCLE 133 ON READER SERVICE CARD

SATISFY your everEXPANDING needs for Data STORAGE

THINK BIG. **THINK MAMMOTH.**

THE MAMMOTH 8MM CARTRIDGE TAPE SUBSYSTEM FROM EXABYTE USES HIGH—PERFORMANCE IDRC DATA COMPRESSION to give you double capacity and throughput. That high capacity along with ultra-fast transfer rate and search speed offers the performance you require to meet growing data storage needs.

BIG ADVANTAGES—

- HIGH PERFORMANCE—for digital video and multimedia applications
- HIGH CAPACITY—40GB [compressed] at 6MB/sec. transfer rate
- COMPATIBILITY with earlier 8mm releases.

The Mammoth 8MM tape subsystem is available today from Consan. Consan distributes a full line of tape, disk and optical storage products from the world's leading manufacturers. For more information on the Mammoth subsystem or other storage products, call Consan today at 1-800-229-DISK [3475].

EXABYTE®
We're Backing It Up.

CONSAN

7676 EXECUTIVE DRIVE
EDEN PRAIRIE, MN 55344
TEL: 612-949-0053
FAX: 612-949-0453

1320 TOWER ROAD
SCHAUMBURG, IL 60173
TEL: 847-519-1060
FAX: 847-519-1248

101 EAST PARK BLVD.
PLANO, TX 75074
TEL: 214-422-3392
FAX: 214-422-3397

PARTNERS IN UNIX MASS STORAGE CONSAN